

THE
ENTOMOLOGIST'S RECORD
AND
JOURNAL OF VARIATION

EDITED BY

G. T. BETHUNE-BAKER, F.Z.S.,
F.E.S., *Chairman.*

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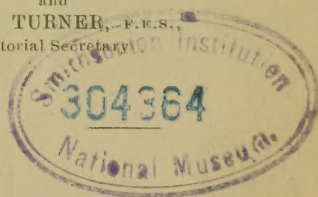
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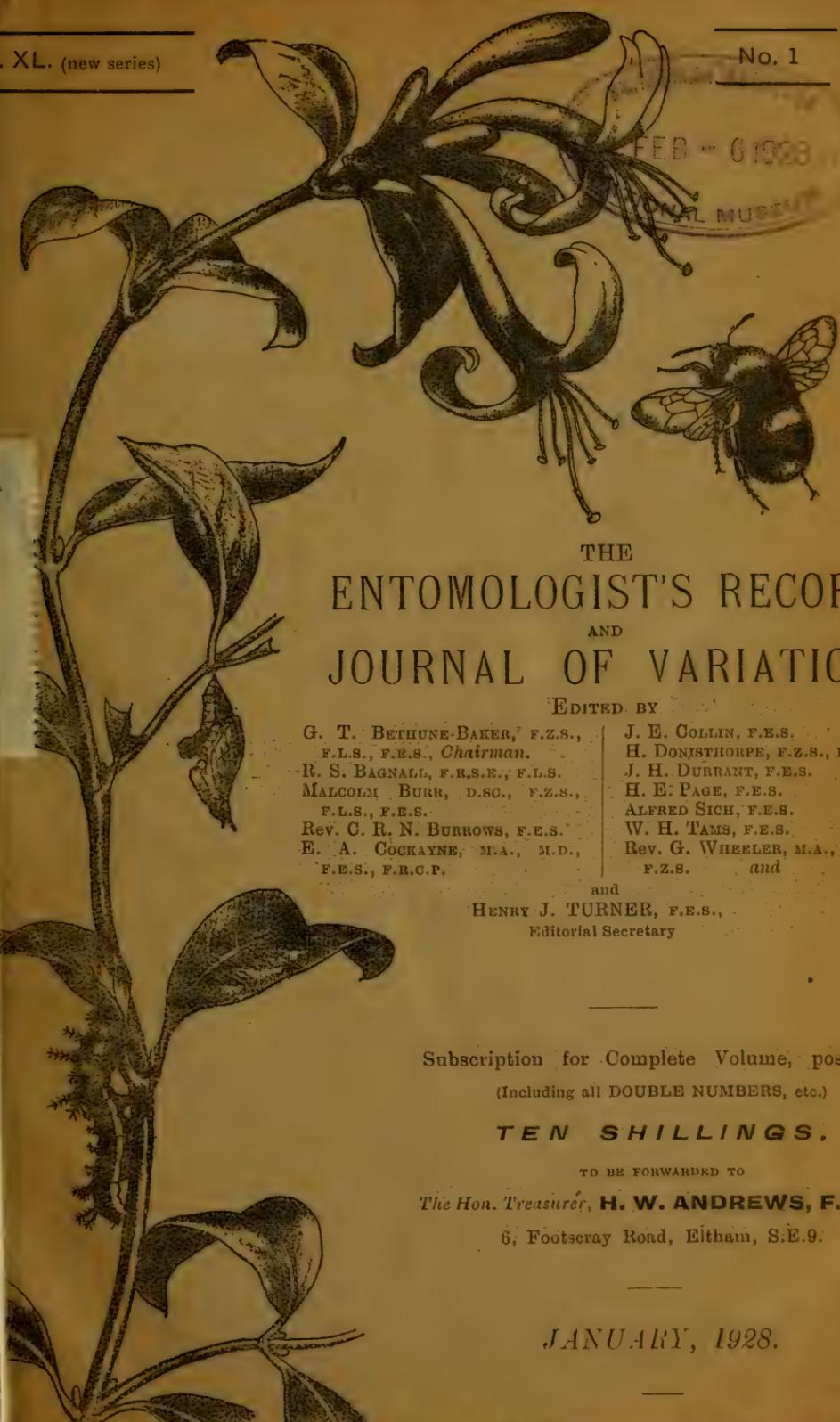
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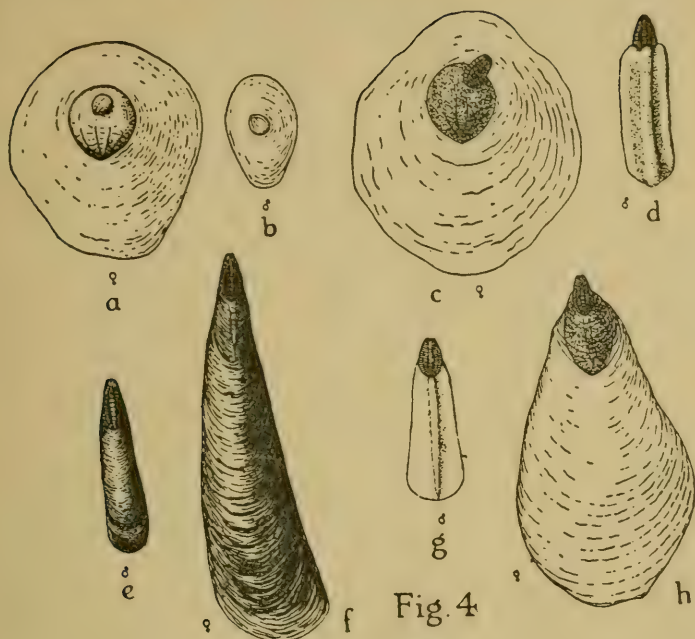


Fig. 4

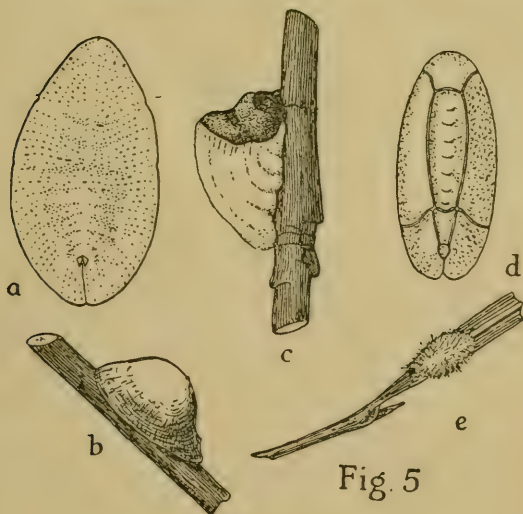


Fig. 5

The Entomologist's Record.

del. E. E. Green.

- FIG. 4. (a) *Aspidiotus hederae*, female scale, $\times 15$; (b) male scale, $\times 16$; (c) *Diaspis rosae*, female scale, $\times 15$; (d) male scale, \times about 30; (e) *Lepidosaphes ulmi*, male scale, $\times 25$; (f) female scale, \times about 30; (g) *Chionaspis salicis*, male scale, $\times 32$; (h) female scale, $\times 18$.
- FIG. 5. (a) *Lecanium hesperidum*, $\times 12$; (b) *Lecanium persicae*, $\times 4$; (c) *Pulvinaria vitis*, female and ovisac, $\times 4$; (d) male puparium, $\times 16$; (e) *Eriopeltis festucae*, female sac, nat. size.

The Entomologist's Record

AND

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VOL. XL. No. 1.

JANUARY 15TH, 1928.

Notes on the Past Season. Rhopalocera.

By S. G. CASTLE-RUSSELL, F.E.S.

In the last issue of the *Entomologist's Record* our Editor remarks that the past season appears to have been an extraordinary one for aberrations and invites notes from subscribers as to their captures and breeding. I hope the invitation will be responded to and I will be one of the first to accept it. Personally I would like to see more notes from the field collectors in this country, on the lines evidenced in the earlier numbers of the Magazine, but I suppose the question of expense prohibits at present the additional space required. Entomologists in general should see that the entomological record, so ably started by my old friend the late J. W. Tutt, does not lack support.

So far as aberrations are concerned, I have not personally found the past season at all exceptional, and, in fact, I found insects generally strictly typical and, judging by the paucity of exhibits at the recent Annual Exhibition of the South London Society, my experience has been shared by others. I know that several remarkable aberrations of *Melitaea athalia* and *Brenthis euphrosyne* were taken, but I have not heard of any very remarkable specimens in other species, with the exception of several underside specimens of *Polyommatus icarus*. I have not seen or heard of anything extraordinary taken among the *Polyommatus (Agriades) coridon* and *P. (A.) thetis (bellargus)*.

In this district and in the New Forest, I found all species just as scarce as they were last year and I saw few signs of encouragement for a better season next year. Certainly *P. thetis* recovered itself at Folkestone and was, I believe, exceptionally abundant, but *P. coridon* at Royston and in the localities I visited was as non-abundant as in last season. The large fritillaries were all scarce and the smaller ones not common, although I found exceptions. In one large wood I visit, there are more than half a dozen spots where *Brenthis selene* always occurs, but in small numbers since 1922, when it swarmed. In June last however in two of these places the insect was really abundant, whilst in the others it was again scarce. What does this imply? That two of the spots were immune from ichneumons? So far as I

can see the places were quite similar, although wide apart. In spite of its abundance, however, this species did not vary in the least, and I only saw one aberration, a heavily clouded specimen on a cream ground, a very unusual form, but it evaded me by getting behind a large bush and turning off the opposite way to which I anticipated, and I never saw it again. In one of these spots *Brenthis euphrosyne* was in fair numbers and more inclined to vary than I have found in past years, but I saw nothing remarkable. It is really a curious thing, but in this wood these two species never seem to vary the same year together.

On September 3rd, I was in the Isle of Wight, where to my surprise, I found *Polygonmatus icarus* in abundance and fresh, *P. coridon* still in numbers, many fresh, and *P. thetis* just emerging and promising to be very abundant. When I left Basingstoke all these species were practically over except *P. thetis*. At Ventnor *Colias croceus* were just coming out and I could have taken several dozen, but I contented myself with two females from which I obtained eggs, and as a result obtained a nice series of about 30, three being *f. helice*: all these emerged between November 9th and 30th. The remainder of the larvae, which were about $\frac{3}{4}$ fed, suddenly died about November 5th.

With regard to my breeding results, I made a most fortunate start by finding a black *Papilio machaon* in my cage on May 8th. This was from one of a number of larvae found by my wife and myself in Norfolk in July 1926. I was also fortunate at being on hand to kill the insect before the delicate scaling inseparable from this kind of form, became injured. We left early in the morning to spend the day near Farnham, but finding this locality very unproductive, we decided immediately after lunch to try our luck elsewhere and as this entailed passing quite close to my house I decided to call to inspect the breeding cages and on doing so I found the black *P. machaon* beginning to get restless with several other butterflies of the same species. The day was a particularly hot and sunny one and had I returned home at the originally anticipated time 5.30 p.m. I am afraid the insect would have considerably damaged itself, as although *P. machaon* does not usually move for a long time after emergence when in the shade, under a strong sun it quickly becomes restive.

The wings of this specimen are completely black all over without any markings except faint blue spots on the lower wings: the two large red spots on the base of the wings on typical specimens are, in this case, replaced by blue spots.

A considerable number of *Pieris napi* emerged from eggs obtained from parents kindly sent me by a friend in Ireland in the spring, and amongst these were several females with exceptionally dark markings and a curious partial gynandromorph. *Aglais urticae* larvae being very abundant in the fields adjoining my house I took a large number, and was rewarded by breeding some nice forms with very large blue spots and a specimen with black hindwings with faint blue markings somewhat similar to the aberration in Frohawk fig. 18.

I had a number of *Melitaea athalia*, *M. cinxia* and *M. aurinia* larvae, but nearly all died when full fed or just after pupation; the result of some disease as no ichneumonids were in evidence. The same befell broods of *Aphantopus hyperantus* and *Rumicia phlaeas*, and as a large number of *P. machaon* larvae and pupae died from the same cause, it would seem that my garden must be infected.

We have now had something like five continuous lean seasons and it is to be hoped that the forthcoming year will show improvement. After all, these fat and lean seasons have been going on for countless years no doubt, and still the butterflies carry on. Unfortunately life is not long enough to appreciate the bad seasons.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

IV. HUAMBA.

Huamba, the first important station on the Benguella Railway, is situated on a cool and breezy plateau at an altitude of about 5500 feet above the sea and the difference in the climate was very noticeable; the early morning air was cold and keen and warm wraps are desirable before the sun is well up and after dark.

The country is a grassy undulating plateau with sparse woodlands. We were most hospitably entertained by the chief engineer, Mr. Varian, whose name had been perpetuated in zoology by its association with the splendid Giant Sable Antelope, *Hippotragus niger* race *variani*, the glory of Angola.

Sweeping in the immediate neighbourhood of Mr. Varian's charming bungalow I found a whole series of interesting Orthoptera. The first stroke of the net showed a very small green and black grasshopper which had a characteristic way of sitting with its hind legs akimbo, so to speak, and not held vertically as with most grasshoppers. It is a powerful hopper and it was with some difficulty that I secured three; one was very tiny, but it is not quite easy to be certain whether they are adult, as they are totally apterous. The attitude of the legs struck a chord of memory: it was one of the *Eumastacidae*, a small but curious family of tropical grasshoppers, nearly all of which have an unusual and often remarkable appearance. It is now nearly thirty years since I worked at the group, yet I feel sure that the genus in question is *Penichrotes*. This was the first Eumastacid I had seen alive, and specimens are by no means common in museums, so I hope to obtain more. Another genus, also quite apterous, is *Thericles*; these have at first glance a very ordinary appearance, just like immature Acridians, but a closer examination reveals the flat face and extremely short antennae that are characteristic of the group. At Huamba I took one or two, perhaps representing two species; one was black and white with marbled femora, the other green with a pale dorsal stripe and a small scarlet spot under the eye. They were fairly common and I took them by sweeping in grass in sparse woodland.

Another creature that interested me very much was a small, greyish slender Locustid, quite apterous, with fairly long ovipositor and very long cerci in both sexes: the two front pair of legs are extremely short, and the hinder pair not very long; the head is very small, and the antennae long; it was the characteristic expression, so to speak, of these organs that led me to think they are Sagids, and if this is so, they are a very puny representative of the formidable species of *Saga*, which I used to take in Macedonia.

I came across four species of Mantids, one the same *Empusa*

which I had found at Loanda; of the others, only one was mature, an elegant pearly slender creature, and a nymph of a big brown fellow with broad pronotum; the fourth was interesting, though unfortunately immature, in its close superficial resemblance to one of the slender Phasmids. In this grassy part of Africa it is striking how many different forms of Orthoptera resemble grasses and their flowers. Apart from the extremely slender Phasmid of which at present I am finding only immature specimens, there is this thin Mantid, with a svelte figure unusual in this group; then there is the familiar genus *Acrida*; the Sagids referred to above scarcely looked like living insects when mixed with the tops of grasses in the net; then there is a narrow and elongate grasshopper with long pointed head, ensiform antennae, and spike on the tail that resembles an exaggerated *Acrida*; I have referred to him as possibly an Opomalid in my letter from Loanda; now I seem to think that *Mesops* is the name. The same thing can be seen in other orders, for I took a couple of Rhynchota, mistaking them for Phasmids, which look just like our common British *Hydrometra stagnorum*, only it is about three times as big and occurs among grass instead of on ponds.

Among the other Orthoptera was a pretty pale green Truxalid, several Stenobothrids, and some Pyrgomorphids; one of these is dingy black in colour with bright scarlet wings; another is bright green, and it is possible that they are two forms of the same species; a very distinctive member of this group is flightless, with an oily black and dark green complexion. The common grasshopper here is an Acridian with a flattened pronotum that recalls a winged *Podisma*. I found him at Loanda, and he is abundant at Huamba. Sweeping also produced a green *Xiphidium* with very long ovipositor and abbreviated elytra and wings, but not the same that I took at Loanda. *Oedipodidae* are not so numerous here as the country is too green, but on a few bare patches there is a handsome fellow with ribbed and crested pronotum and wings that may be scarlet, orange or yellow, with a strong black fascia.

I kept my eyes well open for earwigs but only found one, our old friend *Labidura riparia*, Pall. This is, of course, cosmopolitan, but as mine was a long way from any river or coast, and found under a pile of dirt in a cottage yard, I have no doubt it was brought up from the coast.

V. THE ROAD TO VILLA LUSO.

We abandoned the rail at Huamba and proceeded on our way by motor, covering a distance of 190 kilometres in the first afternoon. The road is straight and good, for, to the credit of the Portuguese, there are 24,000 kilometres of motor roads in the country, though it is perhaps the acme of courtesy to grant the name of road to some of them.

We ran on at a good pace through rolling plains like endless hayfields, passing at times through scrubby woodland. It is noteworthy that at this altitude the tropical forest looks very much like our English woodlands; most of the trees have a superficial resemblance to oaks, both in the colour of the bark and the curliness of the branches but there are few of any girth or height and I was struck with the smallness of timber. All the trees seem to have a tendency

to have flattened, spreading tops. Very many have a piece of bark about 18 inches long and ten or twelve wide cut away at a height of a few feet above the ground; this is due to the natives' habit of improvising a dish or basket by cutting a semicylindrical piece of bark, either to carry wild honey when found, or else, as we often saw them, to carry sand for road repairs.

We slept the first night at a small town called Silva Porto, in the district of Bihé, where the natives distinguish themselves by their commercial instincts and we saw crowds of almost nude blacks sitting round the trading stations, selling their produce to the Portuguese. The inn was primitive but clean and I was pleasantly surprised to be spared that compulsory form of applied entomology, which forces itself upon one's notice in the south of Europe.

The second day we reached the railway construction camp at Cuanza Station at ten, where we were entertained by the engineer in charge with customary African hospitality. We stayed here long enough to be able to do a little collecting around the camp; as the ground is there a bit more open, there were two or three species of *Oedipodidae*. I saw several *Oedaleus*, their yellow and black wings glistening in the sun, but in the noonday heat they were too active, and I was not able to take one; I netted an *Acrotylus* that looks like our familiar European *A. insubricus* and a species of another genus, of which I took specimens, with scarlet, orange and yellow wings, a green *Conocephalus* seems very close to our European *C. nitidulus*, and a pair of green *Niphidium*. I was glad to pick up a Pamphagid: this was my first sight of this typically African group in nature, as I had never had the luck to come across the south European species, probably because I had never been to the right localities at the proper season; unfortunately my specimen was only a nymph, but it is good promise for the future. There were two or three *Stenobothrids* and the three species of *Pyrgomorpha* already met at Huamba.

From the camp a short run brought us to the river itself. The Cuanza is one of the big rivers of Africa and runs through a picturesque course in a north westerly direction to the sea at Loanda. We crossed it by a pontoon. The water is dark, deep and rapid, and in the heat it invited a swim, but it is dangerous to bathe in these African rivers, for fear of catching an unpleasant parasite *Bilharzia*, and also because of the crocodiles; these occur as high up as this ferry, where they take toll of native cattle when they swim across. While waiting for the ferry I swept in the damp grass near the banks, and this produced numbers of small slender *Tettix* and two of a more stumpy figure, and plenty of a pretty little cricket, I think a *Nemobius* with long wings and elytra, longitudinally banded with black and buff.

Beyond the ferry the road is vile, but we had not far to go and stopped for the night at an even more primitive but equally clean inn at Chindumbe. The next day we had 250 kilometres to cover and so left at dawn. In the cool early morning air we saw more signs of animal life upon the road; several times a party of mongoose would scatter in front of us, or we would startle a francolin with its fluffy chicks, which the local folk call the partridge or red-legged pheasant; on the sand by the roadside we saw the spoor of a pair of leopards and the fresh dung of a big antelope, probably the roan. A handsome sight was a large, pale eagle perched in dignity on a tree, while

shrikes, doves, and widow birds, were numerous, pretty little creatures in which the cock has a long wavy tail that flaps in the breeze, whose acquaintance I had first made at São Thomê. At one time we heard a faint booming note, due, our driver said, to the Rain Bird; presently we saw the performer, a great black, ungainly hornbill, *Bucorvus catæ*, not unlike a turkey, with S-shaped neck, bright scarlet wattles, and a great, long, curved beak with the characteristic protuberance above. It is a useful scavenger and the natives refuse to kill it.

At length, at half past three, we ran into Villa Luso, a newly formed town, important as the seat of the government of the province of Mexico, which is to be our base for the next six months. It is pleasantly situated in upland, well-wooded country, a part of the unending forest through which we had been motoring all the day. We met the usual hospitality and celebrated our first dinner here by taking half a dozen spidery Gryllids of the genus *Phacophilacris* on the walls of the wattle and daub house.

A List of Lepidoptera collected in Hayling Island by J. J. Joicey, F.L.S., F.Z.S., F.E.S.

By W. HAWKER-SMITH, F.E.S.

The following is a list of Lepidoptera taken in Hayling Island by Mr. J. J. Joicey, during the summer months of the years 1924 to 1927. The list is necessarily incomplete because few of the autumn, winter or spring species were collected.

The majority of the moths were taken at a bedroom electric light, the most interesting species being a Gem Moth, *Perenoptilota fluvialis*, an immigrant to Southern England. The occurrence of *Phigalia pedaria* in July 1925, suggests a second brood; the two specimens, although rubbed, being otherwise practically undamaged.

PAPILIONIDÆ.—Subfamily *Pierinae*. *Pieris brassicae*, L., 6.viii.1927. *P. napi*, L., 21.vii.1925. *Gonepteryx rhamni*, L., 20.vii.1918.

NYMPHALIDÆ.—Subfamily *Nymphalinae*. *Aglais urticae*, L., Aug. 1926; 30.vii.1927. *Vanessa io*, L., Aug. 1926; 23.viii.1926. *Pyrameis cardui*, L., 20.vii.1926; 21.vii.1926; 27.vii.1926. *P. atalanta*, L., 16.vii.1924; 30.vii.1924.

SATYRIDÆ.—Subfamily *Satyrinae*. *Hipparchia semele*, L., 20.viii.1918; 20.vii.1924; 6-8.vii.1925; 15.viii.1925; 18.viii.1925; 27.vii.1926; Aug. 1926. *Pararge megera*, L., 20.viii.1918; 1-8.viii.1925; 15.vii.1925; 2.viii.1926; 23.vii.1926. *Epinephele tithonus*, L., 20.vii.1925; 27.vii.1926. *Coenonympha pamphilus*, L., 19.viii.1924; 28.vii.1925; 1-8.viii.1925.

LYCAENIDÆ.—Subfamily *Lycaeninae*. *Numicia phlaeas*, L., 30.vii.1927. *Polyommatus icarus*, Rott., 20.vii.1918; Aug. 1919; end June 1925; 21.vii.1925; 15.viii.1925; 2.viii.1926; 5.viii.1926; 7.viii.1926; Aug. 1926; 3.vii.1927.

HESPERIDÆ.—Subfamily *Pamphilinae*. *Adopaea flava* (*thaumas*), Brunn., 21.vii.1925; 28.vii.1925; 2.viii.1926. *Angiades sylvanus*, Esp., 9.vii.1927.

NOTODONTIDAE.—*Notodonta ziczac*, L., 31.vii.1927. *Lophopteryx camolina*, L., 26.viii.1927.

THYATIRIDAE.—*Habrosyne derasa*, L., 14-21.vii.1926; 14.vii.1927; 1.viii.1927. *Palimpsestis octogesima*, Hb., 30.vii.1927.

LYMANTRIIDAE.—*Orygia antiqua*, L., Aug. 1926. *Porthesia similis*, Fuesl., 27.vii.1926; 24.vii.1927. *Stilpnotia salicis*, L., 1.viii.1927.

LASIOCAMPIDAE.—*Malacosoma neustria*, L., 30.vii.1926; 2.viii.1926; 9.vii.1927; 17.vii.1927; 23.vii.1927; 4.viii.1927. *Lasiocampa quercus*, L., 19.vii.1927.

DREPANIDAE.—*Cilix glaucata*, Schiff., 2.viii.1927.

CHLOEPHORIDAE.—Subfamily Sarrothripinae. *Sarrothripus rerayana*, Tr., 17.ix.1926.

ARCTIIDAE.—Subfamily Arctiinae. *Spilosoma menthastris*, Esp., end June 1926; 24.vii.1927. *Phragmatobia fuliginosa*, L., 30.vii.1926; 8.viii.1926. *Arctia caja*, L., 1.vii.1927. *A. villica*, L., end June 1925; 17.vii.1927.

ARCTIIDAE.—Subfamily Lithosiinae. *Mitochondria miniata*, Först., 30.vii.1927. *Lithosia lurideola*, Zk.

NOCTUIDAE.—Subfamily Acronyctinae. *Demas coryli*, L., 2.viii.1926. *Acronicta megacephala*, Fb., 25.vii.1927; 29.vii.1927. *A. psi*, L., 16.vii.1924; 1.viii.1927. *A. tridens*, Schiff., 25.vii.1927. *Bryophila perla*, Fb., 16.vii.1924; 1-15.vii.1925; 20.vii.1925; 22.vii.1925; 28.vii.1925; E. June 1926; 14-21.vii.1926; 28.vii.1926; 2.viii.1926; 7.viii.1926; 8.viii.1926; Aug. 1926; 30.vii.1927; 2.viii.1927; 29.viii.1927. *B. glandifera*, Hb., 25.viii.1927.

NOCTUIDAE.—Subfamily Trifinae. *Agrotis corticea*, Hb., 16.vii.1924. *A. puta* Hb., 2.viii.1926; 8.viii.1926; Aug. 1926; 25.vii.1927; 31.vii.1927; 1.viii.1927; 4.viii.1927; 6.viii.1927; 7.viii.1927; 8.viii.1927; 17.viii.1927. *A. tritici*, L., 30.vii.1924; 15.viii.1925; 9.viii.1927. *A. exclamationis*, L., E. June 1926; 1-7.vii.1926; 14-21.vii.1926; 2.vii.1927; 3.vii.1927; 9.vii.1927; 14.vii.1927. *A. strigula*, Thnb., 14-21.vii.1926. *Noctua c-nigrum*, L., 15.viii.1925; Aug. 1926; 24.viii.1927; 26.viii.1927; 29.viii.1927. *N. rubi*, View., 15.vii.1925; 7.viii.1926; Aug. 1926; 20.viii.1927; 23.viii.1927; 24.viii.1927; 25.viii.1927; 26.viii.1927; 29.viii.1927. *N. xanthographa*, Fb., 15.viii.1925; 7.viii.1926; 8.viii.1926; 17.ix.1926; Aug. 1926; 24.viii.1927; 26.viii.1927; 29.viii.1927; 30.viii.1927. *N. plecta*, L., End June 1926; 14-21.vii.1926; 28.vii.1926; 2.viii.1926; 7.viii.1926; 8.viii.1926; Aug. 1926; 2.vii.1927; 11.vii.1927; 24.viii.1927; 29.viii.1927. *Axyia putris*, L., end June 1926; 14-21.vii.1926; 2.vii.1927. *Triphaena pronuba*, L., 16.vii.1924; 6-8.vii.1925; 15.viii.1925; 30.vii.1926; 2.viii.1926; 5.viii.1926; Aug. 1926; 11.vii.1927; 25.vii.1927. *Triphaena janthina*, Esp., 30.vii.1926; 17.vii.1927. *Barathra brassicae*, L., 6-8.vii.1925; 1-8.viii.1925; 15.vii.1925; Aug. 1926; 23.viii.1927; 29.viii.1927. *Mamestra persicariae*, L., end June 1926. *M. oleracea*, L., 16.vii.1924; 1.vii.1925; 1-15.vii.1925; 14-21.vii.1926; 27.vii.1926; 28.vii.1926; 2.viii.1926; 9.vii.1927; 17.vii.1927; 20.vii.1927; 26.vii.1927; 2.viii.1927; 3.viii.1927; 4.viii.1927; 6.viii.1927; 8.viii.1927. *M. trifolii*, Rott., 5.vii.1927; 29.vii.1927; 1.viii.1927. *M. dentina*, Esp., June 1926; 14-21.vii.1926. *Dianthoecia capsicola*, Hb., 15.viii.1925; 14-21.vii.1926. *D. cucubali*, Fuesl., 28.vii.1926. *Hecatera serena*, F., 7.vii.1924; 11.vii.1924; 16.vii.1924; 20.vii.1924; 30.vii.1924;

18.vii.1927; 24.vii.1927; 26.vii.1927; 31.vii.1927; 1.viii.1927. *Luperina testacea*, Hb., 26.viii.1927. *Cerigo matura*, Hufn., 30.vii.1926; 5.viii.1926; 7.viii.1926; 8.viii.1926; Aug. 1926; 31.vii.1927; 1.viii.1927; 4.viii.1927; 20.viii.1927; 26.viii.1927. *Apamea gemina*, Hb., end June 1925; 1.vii.1925; 6-8.vii.1925; end June 1926; 1-7.vii.1926; 7-14.vii.1926; 2.vii.1927; 3.vii.1927; 9.vii.1927; 10.vii.1927; 18.vii.1927. *A. secalis*, L., 11.vii.1924; 16.vii.1924; 1.vii.1925; 1-15.vii.1925; 6-8.vii.1925; end June 1925; 2.vii.1925; 28.vii.1925; 1-8.vii.1925; 15.viii.1925; 27.vii.1926; 28.vii.1926; 30.vii.1926; 2.viii.1926; 8.viii.1926; 29.vii.1927; 1.viii.1927; 7.viii.1927; 17.viii.1927; 26.viii.1927. *Miana strigilis*, Cl., 1-15.vii.1925; end June 1926; 1-7.vii.1926; 7-14.viii.1926; 14-21.vii.1926; 2.vii.1927. *M. bicoloria*, Vill., 30.vii.1926; 14.viii.1926; 8.viii.1926; 4.viii.1927; 29.viii.1927. *Xylophasia lithargyrea*, Fb., 11.vii.1927; 17.vii.1927. *X. monoglypha*, Hufn., 16.vii.1924; 20.vii.1924; end June 1926; 6-8.vii.1925; end June 1926; 7-14.vii.1926; 14-21.vii.1929; 28.vii.1926; 1.vii.1927; 9.vii.1927; 11.vii.1927; 17.vii.1927; 20.vii.1927; 26.vii.1927; 29.vii.1927; 20.viii.1927; 29.viii.1927. *Euplexia lucipara*, L., 20.vii.1926. *Phlogophora meticulosa*, L., 15.viii.1925; Aug. 1926; 23.viii.1926; 26.viii.1927. *Mormo maura*, L., 2.viii.1926; 5.viii.1926. *Hydracca nictitans*, Bkh., 28.vii.1926; 30.vii.1926; 2.viii.1926; 7.viii.1926; 17.viii.1927. *H. micacea*, Esp., 15.vii.1925; 30.vii.1925; Aug. 1926; 17.ix.1926; 20.viii.1927. *Nonagria geminipuncta*, Hatch., 30.vii.1926. *Leucania pallens*, Fr., 1.vii.1925; 21.vii.1925; 15.viii.1925; 18-24.viii.1926; 7-14.vii.1926; 28.vii.1926; 30.vii.1926; 2.vii.1927; 9.vii.1927; 14.vii.1927; 23.vii.1927; 2.viii.1927. *L. impura*, Hbn., 16.vii.1924; 1.vii.1925; 7-14.vii.1926; 27.vii.1926; 28.vii.1926; 30.vii.1926; 7.viii.1926; 9.vii.1927; 10.vii.1927; 14.vii.1927; 18.vii.1927; 23.vii.1927; 24.vii.1927; 26.vii.1927; 29.vii.1927; 31.vii.1927; 1.viii.1927; 2.viii.1927; 3.viii.1927; 6.viii.1927. *L. comma*, L., 1-7.vii.1926; 7-14.vii.1926; 2.vii.1927. *L. lithargyria*, Esp., 7-14.vii.1926; 27.vii.1926; 28.vii.1926; 30.vii.1926; 2.viii.1926; 31.vii.1927; 1.viii.1927; 2.viii.1927; 4.viii.1927. *L. conigera*, F., 16.vii.1924; 30.vii.1924; 27.vii.1926; 28.vii.1926; 15.vii.1927; 23.vii.1927; 31.vii.1927; 4.viii.1927. *Caradrina alsines*, Brahm., 30.vii.1926; 2.viii.1926; 18.vii.1927; 23.vii.1927. *C. taraxaci*, Hb., end June 1926; 2.viii.1926; 4.viii.1927. *C. ambigua*, F., 30.viii.1927. *Amphipyra tragopoginis*, L., 15.viii.1925. NOCTUIDAE.—Subfamily *Quadrifinae*. *Plusia chrysitis*, L. 11.vii.1927. *P. iota*, L., end June, 1926. *P. gamma*, L., 16.vii.1924; 6-8.vii.1925; 21.vii.1925; 15.viii.1925; end June, 1926; 27.vii.1926; 2.viii.1926; 3.vii.1927; 9.vii.1927; 11.vii.1927; 4.viii.1927; 8.viii.1927; 27.viii.1927; 31.viii.1927.

NOCTUIDAE.—Subfamily *Hypeninae*. *Zanclognatha tarsipennalis*, Tr., 7-14.vii.1926; 1.viii.1927; 2.viii.1927; 4.viii.1927. *Z. grisealis*, Hb., 14-21.vii.1926. *Hypena proboscidalis*, Hb., 31.vii.1927.

GEOMETRIDAE.—*Pseudoterpna pruinata*, Hufn., 2.viii.1926; 24.vii.1927. *Hemithea strigata*, Mull. = *aestivaria*, Hb., 1-7.vii.1926; 30.vii.1926; 11.vii.1927. *Ptychopoda (Acidalia) virgularia*, Hb. = *seriata*, Schrnk., end June, 1926; 27.vii.1926; 2.vii.1927; 3.viii.1927. *P. (A.) aversata*, L., 11.vii.1924; 30.vii.1924; 1-15.vii.1926; end June, 1926; 14-21.vii.1926; 27.vii.1926; 28.vii.1926; 8.viii.1926; 11.vii.

1927; 14.vii.1927; 1.viii.1925; 4.viii.1927; 6.viii.1927. *P. (A.) dimidiata*, Hufn., 4.viii.1927. *Acidalia marginipunctata*, Groze, 29.vi.1924. *Timandra amata*, L., 7.viii.1926. *Ortholitha plumbaria*, F.=*mucronata*, Scop., 5.vii.1927. *O. limitata*, Scop.=*chenopodiata*, L., 20.vii.1924; 27.vii.1926; 28.vii.1926; 15.vii.1927. *Lygria associata*, Bkh., end June, 1926; 7-14.vii.1926; 10.vii.1927. *L. pyraliata*, Hb., 7.viii.1926; 23.vii.1927. *Cidaria fulvata*, Forst., 2.vii.1927. *Dysstroma truncata*, Aug. 1926. *Xanthorrhoe unidentaria*, Haw., 22.vii.1925; 27.vii.1926; 28.vii.1926; Aug. 1926. *X. ferrugata*, Cl., 27.vii.1926; 28.vii.1926; 30.vii.1926; 8.viii.1926; Aug. 1926; 22.vii.1927; 29.vii.1927; 1.viii.1927; 2.viii.1927; 4.viii.1927; 9.viii.1927. *X. fluctuata*, L., 28.vii.1925; 30.vii.1926; 29.vii.1927; 30.vii.1927; 29.viii.1927; 30.viii.1927. *Epirrhoe galiata*, Hb., end June, 1926; 7.viii.1926; 9.vii.1927. *E. sociata*, Bkh.=*alternata*, Mull., 1.vii.1927. *Euphyia mangulata*, Haw., 22.vii.1925; 17.vii.1927; 1.viii.1927. *Mesoleuca ocellata*, L., 2.vii.1927; 29.viii.1927. *Camptogramma bilineata*, L., 29.viii.1927. *Hydriomena furcata*, Thunbg., 6-8.vii.1925; 20.vii.1925; 30.vii.1926; 17.vii.1927; 23.vii.1927. *Anticlea rubidata*, Fb., 14-21.vii.1926. *Eupithecia oblongata*, Thunbg.=*centaureata*, Schiff., 22.vii.1925; 15.viii.1925; 18-24.viii.1925; 30.viii.1925; 2.vii.1927; 4.viii.1927. *E. pulchellata*, Stph., end June, 1926. *E. absinthiata*, Cl., 7-14.vii.1926; 28.vii.1926; 30.vii.1926; 11.vii.1927; 17.viii.1927; 24.viii.1927. *E. subfulvata*, Haw.=*icterata*, Vill., 15.viii.1925; 28.vii.1926; 8.viii.1926; 2.viii.1927; *Gymnoscelis pumilata*, Hb., 1.vii.1927; 29.viii.1927. *Pelurga comitata*, L., 5.viii.1926. *Horisme (Phibalapteryx) tersata*, Hb., 29.vii.1924. *Orthonama (Percnoptilota) fluvrata*, Hb.=*obstipata*, Fb., Aug. 1926. *Abraxas grossulariata*, L., 16.vi.1924; 21.vii.1925; 30.vii.1927; 31.vii.1927. *Ennomos alniaria*, L., 7.viii.1926; Aug. 1926. *E. fuscantaria*, Haw., Aug. 1926; 29.viii.1927. *Selenia bilunaria*, Esp., 16.vii.1924; 6-8.vii.1925; 28.vii.1926; 2.viii.1926; 5.viii.1926; 7.viii.1926; 15.vii.1927; 24.vii.1927; 25.vii.1927; 26.vii.1927; 29.vii.1927; 31.vii.1927; 1.viii.1927; 2.viii.1927; 4.viii.1927; 19.viii.1927. *Crocallis elingvaria*, L.—18-24.viii.1925; 27.vii.1926; 7.viii.1926; Aug. 1926; 15.vii.1927; 23.vii.1927; 24.vii.1927; 31.vii.1927; 31.vii.1927; 2.viii.1927; 19.viii.1927; 20.viii.1927; 24.viii.1927; 26.viii.1927. *Ourapteryx sambucaria*, L., 11.vii.1927; 17.vii.1927. *Opisthograptis luteolata*, L., 30.viii.1925; 23.viii.1927; 29.viii.1929. *Phigalia pedaria*, Fb., 6-8.vii.1925. *Biston (Pachys) betularia*, L., 4.viii.1927. *Boarmia gemmaria*, Brahm., 30.vii.1924; end June, 1926; 1-7.vii.1926; 7-14.vii.1926; 14-21.vii.1926; 27.vii.1926; 30.vii.1926; 2.viii.1926; 8.viii.1926; Aug. 1926; 2.vii.1927; 9.vii.1927; 11.vii.1927; 14.vii.1927; 15.vii.1927; 20.vii.1927; 25.vii.1927; 29.vii.1927; 31.vii.1927; 1.viii.1927; 2.viii.1927; 4.viii.1927; 17.viii.1927; 19.viii.1927. *B. repandata*, L., 14.vii.1927. *Selidosema ericetaria*, Vill.=*plumaria*, Schiff., 15.vii.1925; 3.viii.1927. *Aspitates ochrearia*, Rossi, 20.viii.1925; Aug. 1926; 29.viii.1927.

PYRALIDAE.—Subfamily *Gallerianae*. *Aphomia sociella*, L., 18-24.viii.1925; 2.viii.1926; 29.vii.1927.

PYRALIDAE.—Subfamily *Crambinae*. *Crambus tristellus*, Fb., 15.viii.1925; 2.viii.1926; 23.viii.1927. *C. perlellus*, Scop., 2.viii.1926.

PYRALIDAE.—Subfamily *Phycitinae*. *Myelois cribrella*, Hb., 3.vii.1927; 1.viii.1927.

PYRALIDAE.—Subfamily *Endotrichinae*. *Endotricha flammealis*,

Schiff., 1.viii.1927; 17.viii.1927. *Uedeobia angustalis*, Schiff., 7-14.vii.1926; 30.vii.1926; 11.vii.1927.

PYRALIDAE.—Subfamily *Pyralinae*. *Hyposopygia costalis*, Steph., 1-7.vii.1926; 8.viii.1926; 2.vii.1927; 22.vii.1927.

PYRALIDAE.—Subfamily *Hydrocampinae*. *Eurrhyncha urticata*, L., 2.vii.1927; 11.vii.1927; 20.vii.1927; 4.vii.1927.

PYRALIDAE.—Subfamily *Pyraustinae*. *Sylepta ruralis*, Sc.; 29.viii.1927; *Nomophila noctuella*, Schiff., 7-14.vii.1926; *Pionea forticalis*, L., 1-8.viii.1925; 15.viii.1925; 30.viii.1925; 2.viii.1926; 23.viii.1927; 29.viii.1927. *Pyrausta cespitalis*, Schiff., 2.vii.1927.

ZYGAENIDAE.—*Zygaena filipendulae*, L., 3.viii.1927.

HEPIALIDAE.—*Hepialus humuli*, L., 3.vii.1927; 11.vii.1927. *H. sylvinus*, L., 30.viii.1925; 2.viii.1926.

TORTRICIDAE.—*Tortrix podana*, Scop., 11.vii.1927 ♂; 22.vii.1927 ♀; *Nanthosetia zozana*, L., 1.vii.1927; 22.vii.1927; 30.vii.1927. *X. hamana*, L., 30.vii.1927.

Dr. Verity's Nomenclature. A Criticism upheld.

By A. J. WIGHTMAN, F.E.S.

On page 167 *ante* Mr. P. P. Graves expresses his disagreement with certain of Mr. G. T. Bethune-Baker's criticisms of Dr. Verity's nomenclature in an article published in *Ento. Record*, Vol. XXXIX, page 164. Mr. Graves refers to article 14 of the proposed rules found in the report of the British National Committee on Entomological Nomenclature, for which Mr. Bethune-Baker was chairman and says "The report defines a sub-species as a geographical variation and proceeds to claim that Dr. Verity's "races" are geographically variations and therefore equivalent to sub-species, and implies that Mr. Bethune-Baker's criticisms are unwarranted and incorrect in substance.

But Dr. Verity himself frequently admits that forms he has named, or is naming, as "races," are not the universal fixed form in the geographical area inhabited by the colony, or colonies, he is naming, but simply a form occurring in greater, or lesser, numbers with other forms found there, and indeed in some cases he has named races on the strength of odd specimens he has taken, or obtained.

The meaning of the term geographical variation in rule 14 above referred to seems to me to be quite clear, and I should interpret it as follows.

When a colony of an insect (which from its life-history, genitalia, etc., is deemed to be co-specific with species already named) inhabiting some definite geographical area has some special facies present on ALL its members, which would distinguish them from similar forms found outside this area, we have a geographical variation and a sub-species.

As an example of true subspecies let me refer to page 42 of the *British Noctuae and other varieties* by Mr. H. J. Turner now in course of publication in the *Ento. Record*, where we read in reference to *Moma alpinum*, Osbeck.

"*Agriopodes fallax* is a representative species in the Nearctic region which in general colour and disposition of markings suggests *alpinum* as a near connection."

"All the others listed are S. Eastern Palaearctic representatives, which in varying degrees closely resemble *alpinum*.

"An examination of Warren (Seitz), and Hampson figures will suggest to students that they must all be geographical races of that species."

Here we have fixed forms inhabiting different areas, yet so closely allied to a named species as to be considered sub-specific, not distinct species.

Dr. Verity uses the term "race" to designate some special colony inhabiting a defined area, among the members of which he finds SOME individuals with special characteristics, which, more in some, less in others, show a tendency to produce certain extra markings, special depth of colour, etc. Often these differences are so slight in individuals, that it is necessary to give a general description of the points of difference seen divided among a number of individuals, to make the description sufficiently different from other named forms as to warrant a new name at all. He has himself written in some of his articles, after a general description of the members of a colony, which he is naming, that they differ little from some race previously named.

As an example of this general description of a colony, which he is naming as a subspecies,* his latest article in the *Ento. Record*, page 173; is a first class example, he describes race *orientalpinum* of, *Nytha actaea exerge ferula* F., as follows.—

"Wings OFTEN more elongated, narrower, with more pointed apex and a straighter outer margin, underside of male USUALLY of a warmer brownish tone than in *orsiera*, with softer streaks and OFTEN with no spaces. WHEN THEY EXIST, the central band-like one is narrow and they are dusted with black. So that they never have the extent, the sharpness and the clear silvery-white face of MANY western individuals. On upperside of female the fulvous is considerably less and reduced to rings around two eye spots. These rings are OFTEN very thin and EVEN TOTALLY OBLITERATED. On underside of hindwings the pattern is less sharp than it USUALLY is in the west, and the whole wing has a more uniform and warmer brownish tone." The emphasis is mine. As will be seen from the text of the article which preceeds the part I have quoted, a very similar form has been noted before from quite another area.

I say it is impossible to establish a sub-species on such a generalisation of admittedly unfixed characters, but as a general description of the sort of form likely to be found in the localities given it is excellent.

No one doubts, but that Dr. Verity has done much excellent work in making known the vast amount and extent of local variation to be found in the extensive areas he has so carefully worked, but it is contended that in his anxiety to give a full and comprehensive catalogue of these many and diverse forms, he allows himself to bestow racial names on forms which do not merit such a distinction, and that as a result, the good work, which he has done and is still doing, is liable to be misjudged and precondemned. Moreover in spite of Mr. Graves' statement to the contrary in such high sounding terms, the naming of

*A "subspecies" is a "race," but only some "races" are "subspecies." This form is not a "subspecies" but is called a "race" by Dr. Verity.—Hy. J. T.

distinct forms at all is being brought into question by workers of standing, who are complaining that naming has already been carried too far, and that some rule should be introduced, which will throw out all names below the rank of species and subspecies, and by the latter term they mean geographical forms so specialised as to suggest that they may, in fact, be distinct species.

In conclusion therefore, let me say, that Dr. Verity's races are not subspecies in the sense of rule 14 of the report of the British National Committee on Entomological Nomenclature and that the criticisms of Mr. Bethune-Baker, previously referred to, are warranted and to the point.

The Copulation of *Scraptia fuscula*, Müll.; and a case of abnormal copulation in two species of Staphylinidae of different Genera.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

I was fortunate enough to observe the copulation of *Scraptia fuscula*, Müll., in nature this year. I was in Windsor Forest on July 13th, the evening of that day being still and warm, and the beetle in question was flying gently through the air. Several couples were captured, and others observed. The ♂♂ were firmly attached posteriorly to the ♀♀, and both sexes were flying with the wings expanded. The ♀♀ carried the ♂♂, and appeared to control the direction of the flight. With this species, copulation thus takes place in the air. As far as I am aware this has never been recorded before.

On November 23rd last when sifting some loose hay in a deer pen in Windsor Forest, various species of "Staphs." including *Heterothops praevia*, Er., *H. dissimilis*, Gr., *Microglossa suturalis*, Sahl., *Homalium concinnum*, Marsh, etc., were taken. *H. praevia* was not uncommon, but I only bottled a few specimens, *H. dissimilis*, being much rarer. On November 30th, I went down again to try and get more of the former species, but found it had entirely disappeared, and only a few *H. dissimilis* occurred. One of these was placed in a tube with a specimen of *Quedius scintillans*, Gr. When I looked at the tube again these two species of different genera were observed to be in cop., and they remained in that condition until they were killed. It was a case of true copulation, the beetles being firmly joined together, the ♂ (*Heterothops*) being dragged along by the ♀ (*Quedius*) when she walked about, as is the habit with Staphs., when in *coitü*.

NOTES ON COLLECTING, etc.

A VARIETY OF *HEPIALUS HUMULI*.—On a piece of rough boggy ground at Epworth, Lincolnshire, this common species is quite abundant, in fact, I have noticed as many as 50 specimens there in one evening. I did not take many of them, but on July 11th, 1927, I captured a very dark female, which I have shown to the Rev. G. H. Raynor and Mr. L. W. Newman, who both think it worthy of record. It approaches the Shetland form of the insect var. *hethlandicus*, Stdgr. (*thulensis*, Crotch.), and is much like fig. 4, plate 157, in South's *Moths of the*

British Isles, Vol. II., but it is of the opposite sex. The forewings of my specimen are very dusky ochreous, but not so dark as to prevent the visibility of the horizontal markings. The hindwings are distinctly darker than those figured by South, in fact, they may fairly be called black. I have now left Epworth and shall probably not have an opportunity of finding out whether this is a constant variety or merely a chance aberration.—WILLIAM QUIBELL, Brampton, Huntingdon, December 10th, 1927.

BREPHOS PARTHENIAS AB. FLAVA, WOOD.=AB. LUTEATA, HENNIN.—In my *List of Geometers of the British Islands*, I overlooked the ab. *flava*, Wood, *Ent.* XLIX, 80. 1916. The description reads, "Forewings grey-brown without any trace of the reddish suffusion of the typical *parthenias*. Hindwings a pale clear yellow; markings as in the typical insect." Wimbledon Common, Surrey, several examples in different years. In 1910, Dom Guy de Hennin, *Rev. Mens. Soc. Ent. Namur*, described an ab. *luteata* as follows, "The orange colour of the lower wings and of the reverse of all the wings is replaced by yellow. The freshness of the colours and the fringes do not suggest discoloration." Neighbourhood of Maredsous, Valley of the Molinee, Belgium. These descriptions do not seem to differ in any way, hence the name *flava*, Wood, 1916, falls to *luteata*, Hennin 1910. I am indebted to my kind correspondent M. Derenne, Hon. Sec. of the Union des Entomologistes Belge, for the suggestion that these two descriptions are of similar aberrations.—HY. J. TURNER.

CURRENT NOTES AND SHORT NOTICES.

Messrs. Lovel Reeve & Co. Ltd., Publishers, late of Henrietta Street, London, have moved to Lloyd's Bank Buildings, Bank Street, Ashford, Kent. As is well known to all entomologists they were the publishers of Curtis's *British Entomology*; Fowler's *Coleoptera*, Saunders's *Hymenoptera-Aculeata*, and Hemiptera-Heteroptera, and Edwards's *Hemiptera-Homoptera*, of the *British Isles*; Moggeridge's "*Harvesting Ants and Trap-Door Spiders*," etc. Also numerous works on *Lepidoptera*, *Botany*, *Sea-weeds*, *Fungi*, etc. The writer well remembers calling every month at Henrietta Street, towards the end of the 80's, for his Fowler which was then appearing in parts; also how eagerly he used to look forward to receiving them by post when he was in Germany.—H. ST. J. D.

A Meeting of the Entomological Club was held at the Zoological Museum, Tring, on October 15th, 1928, Lord Rothschild in the Chair. Members present—Lord Rothschild, Mr. Robt. Adkin, Professor E. B. Poulton, Mr. Horace Donisthorpe, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, Mr. W. J. Kaye. Visitors present—Dr. Louis W. Sambon, Major E. E. Austen, Capt. N. D. Riley, Rev. Geo. Wheeler, Dr. Karl Jordan, Dr. Ernst Hartert, Commander J. J. Walker, Dr. S. A. Neave, Dr. J. Waterston, Dr. Hugh Scott, Dr. E. A. Cockayne, Dr. F. A. Dixey, Messrs. Philip Graves, H. M. Edelsten, K. G. Blair, W. E. F. Nelson, W. Rait-Smith, Hy. J. Turner, Louis B. Prout, John Levick, W. H. T. Tams, R. E. Cheesman. A letter of apology and regret for non-attendance was received from Dr. Harry Eltringham who was in

Scotland. The guests arrived by road and train, those adopting the latter route were met by motor cars at Tring Station. They were received by Lord Rothschild at the Zoological Museum where the large Entomological and other collections were open for inspection and were greatly enjoyed throughout the morning. Lord Rothschild especially exhibited the genus *Tetralolus*, contained in 66 drawers. The specimens of each species were arranged according to locality and seasons, most of the species showing very remarkable seasonal differences. He also exhibited in 3 drawers various sub-species of the genus *Morphotenaris*, from New Guinea. Further, one drawer with *Colias aurorina*, *C. saartia* and a series of specimens supposed to be hybrids between these two species. Also four drawers of hybrid *Sphinxidae*, mostly obtained in Austria and Switzerland from pairings in captivity. Luncheon was served at one o'clock after which a further tour of the Museum was made. The company dispersed in the late afternoon after spending a most interesting and enjoyable day.—H.W.-E.

A Meeting of the Entomological Club was held at "Caracas," Ditton Hill, Surbiton, on November 15th, 1927, Mr. W. J. Kaye in the Chair. Members present in addition to the Chairman:—Mr. Robt. Adkin, Mr. Horace Domsthorpe, Professor E. B. Poulton, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, Dr. Harry Eltringham. Visitors present:—Dr. E. A. Cockayne, Major E. E. Austin, Mr. Frank A. Oldaker, Mr. Arthur Hill, Mr. W. Rait-Smith. The guests were received by Mr. and Mrs. Kaye, and light refreshments were provided, and an early retirement was made to the host's studies, where the interesting collections of Lepidoptera were inspected. These included a good series of British insects and also the large collections made by Mr. Kaye during his many visits to various tropical countries. Supper was served at 8 o'clock and after a most interesting evening the guests dispersed at a late hour.—H.W.-E.

The *Supplementa Entomologica*, received sometime ago and issued as a supplement to the *Ent. Mitt.*, the Journal of the Deutsch Entomolog. Institut, contains a series of further contributions towards the Fauna of Sumatra, the material being sent over by Edward Jacobson. The separate portions of the orders Coleoptera, Diptera, Hemiptera, etc., are dealt with by specialists of world-wide fame. This is the 3rd number of the issue and consists of 124 pages with numerous text figures. It is a worthy contribution to our knowledge of island fauna and Dr. Horn is to be congratulated on the success of his efforts to get the best talent to work on each separate section.

Through the kindness of Dr. Zerny of Vienna we have received a copy of his paper "Die Lepidopteren Fauna von Algeciras und Gibraltar in Sud-Andalusien," an account of his long holiday in the early part of the year 1925. As the author devotes himself to the Heterocera mainly, his record contains a great deal of information not hitherto reported from the area dealt with. He points out that most of the Englishmen, who go there, devote themselves almost entirely to the Rhopalocera and neglect the lure of the electric light and night work. He gives notes on over 500 species and describes over eleven new races and aberrations; some of the determinations were verified by Messrs. Prout & Durrant. We notice one or two errors in spelling e.g., *egevia*, *megaera*, and that all the "races" have been promoted to "sub-species" in that the racial name is placed next to the specific

without a particle. The author accepts the view of Sagarra, Querci and Romei that *calida* is specifically distinct from *medon* (*astrarche*). This will be a most useful paper of reference to the future race of lepidopterists, who do not devote themselves entirely to the gay butterfly. We shall await with expectation the notes on Dr. Zerny's holiday of 1927 for he realized a life-long desire to visit S. America and spent six months in Brazil. He writes us that *Rhopalocera* were undoubtedly scarce but that he obtained a very large number of *Heterocera* which are generally so abundantly at light in that part of the world.

The Società Entomologica Italiana seems to have revived since its removal to Genoa and its *Bollettino* and *Memoirie* are issued at more regular intervals. Fasc. II. of Vol. V. of the latter was issued some months ago and contains some half a dozen papers with two plates and text figures. The reports of the meetings shew that quite good work is being done and that the interest of members in the Society continues to increase.

In the *Bull. Soc. ent. France*, 1927, p. 244, M. Stempffer describes a new form of *Cupido minimus* as subsp. *earsuelli*, from 2!!! specimens sent to him from Sierra de Espuña, Spain, where it is said to be the constant form. Neither the genitalia nor the androconia have been examined. The disposition of the dots on the underside of the hindwings is said to be the most striking characteristic of the form. "Rangée d'ocelles du dessous des inférieures formant une ligne brisée à angles très ouverts, les trois derniers ocelles proches de l'angle anal faisant suite aux quatre précédents alors que, chez *minimus*-type, ils sont déportés très loin vers le bord marginal." Two examples of *minimus* lie before me from Gavarnie, taken at the same time, in one of which the "ocelles" are almost in line with the four preceding, in the other they are strikingly divergent. What have our readers to say about this subsp. (?)?

The *Zeit. Osterr. Entom. Vereines*, published in Vienna, initiated in 1916 has now reached its 12th volume. Five plates have been issued during the year and the matter is very good, furnished by reliable working entomologists. Dr. Rebel and Dr. Zerny in the last two numbers have described several new species of micro-lepidoptera from Spain. Dr. Schawerda describes and figures a new race or subsp. of *Agrotis tritici* from South Corsica, as *falleri*. A list of the Lepidoptera occurring in the S. Western part of Lower Austria is in progress of issue. Our correspondent Dr. J. F. Berger is largely responsible for this useful periodical.

Recent numbers of *Lambilionea* (*Revue mensuelle*) contain the following new aberrations. (1) *Aglais urticae* ab. *pseudconnexa*. Mr. C. Cabeau captured an example near Liège in which the inner marginal black spot and the costal median spot are united by a double angled band of thick rows of black scales. One angle approaches the basal costal spot the other the two discal spots. (2) *Papilio machaon* ab. *biadaperta*. Dr. Mezger bred an example from Holland. On the underside of the hindwings the discocellular mark encloses two yellowish marks, that is a small spot (minuscule) and a long and narrow mark.

In the *British Noctuae* now appearing as a supplement, the end of the *Bombyceiformes*, Gn. (*Cymatophoridae*, *Bryophilidae* and *Acronyctidae*), is almost reached, and before beginning the *Genuinae* (*Leucaniidae*, etc.) a short appendix will be inserted containing items which, partly inadvertently, were omitted. I should be pleased to insert original descriptions, of which I am unaware, if readers will send either the references or the actual description.—HY. J. T.

The December number of the *Ent. News* contains a long and appreciative notice of the late G. C. Champion by P. P. Calvert, a life-long correspondent.

We read that Dr. L. O. Howard has resigned his position as Chief of the U.S. Bureau of Entomology after more than thirty-three years of service in the Department of Agriculture, and his fiftieth year of Government service. However it does not mean that he retires from entomological work, but only from administrative responsibilities. He is still keen in his favourite branches of medical entomology and parasitology. His name was brought prominently before the public at two periods, *viz.*, in the mosquito campaign and the house-fly crusade. He is succeeded by Dr. Marlatt the assistant Chief.

The little *Amateur de Papillons* still goes on its slow way. The Editor appears to find it difficult to bring the magazine out to date. We only received the October number a short time ago and there are still one or two back numbers which have not yet been issued. The articles are very valuable ones to the student and collector of French lepidoptera, and full of most practical field work and details.

A long article on "Mountain and Lowland Melanism and Darkening" has been running through several numbers of the *Int. Ent. Zeit.* (Guben) during the past two months. There are included useful detailed lists of the species exhibiting melanism. First there are those apparently connected in some way with industry (1) some 15 species cited by Doncaster (*Ent. Rec.* 1906) all occurring in Central England, the industrial area; (2) some 41 species from the neighbourhood of Hamburg (teste Dr. Hasebroek). (3) some 7 species from the Upper Silesian industrial area (teste Dr. Rebel) (4) further 15 species from the Ruhr coal-mining area (teste Grabe). The second category are the mountain species which exhibit melanistic forms (1) some 103 species of Swiss macrolepidoptera (teste Vorbrodt); it is suggested that some of these may be influenced by industry. (2) some 22 species from the North Tyrol (teste Hellwegers). (3) some 24 species from Saxony (teste Mobius). The third category are the melanistic forms occurring on the coast country. A long list collected from various sources in this country and on the continent. References are given to those species which occur in two or more categories. Summaries and a discussion of the investigations of Dr. Hasebroek are given with a few notes on the phenomena in melanism exhibited in other orders of the animal kingdom. The writer concludes that it was amply shewn by the material he had brought together, that melanism caused under the influence of industrial surroundings and in breeding with special *habitus*, was quite exceptional.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

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Desiderata.—Back volumes of Trans. Ent. Soc. Lond., and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of christyi, abruptaria v. brunnea, black consonaria and bidentata, extensaria, curzoni, jasionata, venosata (Shetl.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. Herminia flavicrinis, Andreas, Nych. dalmatina race andreasaria, Warnecke, about 30 species of rare Acidalias; pupae of Eupithecia illuminata or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

Duplicates.—P. apollo nevadensis and rare Palearctic Rhopalocera, also African Danaidae, Charaxes and Hypolimnas.

Desiderata.—Many rarer and few common species Rhopalocera. European only.—W. G. Pether; 4, Willowbridge Road, London, N.1.

Duplicates.—Fine bred prunaria grossulariata varieties and many other species.

Desiderata.—Ova of truncata and citrata.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—Strangalia aurulenta (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.

Duplicates.—Bred Sparganii, Ochroleuca, Maritima, Straminea, and many other Noctuae.

Desiderata.—Pupae Carpophaga.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially Carabus, sps., for striking Coleoptera from all parts of the World.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. January 18th. February 1st and 15th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. January 26th. February 9th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed.—Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W. 2.

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Communications have been received from or have been promised by Messrs. Dr. Verity, H. J. Turner, K. J. Hayward, C. J. Wainwright, A. H. Martineau, W. H. Edwards, Lt. E. B. Ashby, Dr. Malcolm Burr, W. Parkinson-Curtis, A. J. Wightman, Dr. E. A. Cockayne, H. Donisthorpe, Wyndham Forbes, E. E. Green, P. P. Graves, W. Hawker-Smith, and Reports of Societies.

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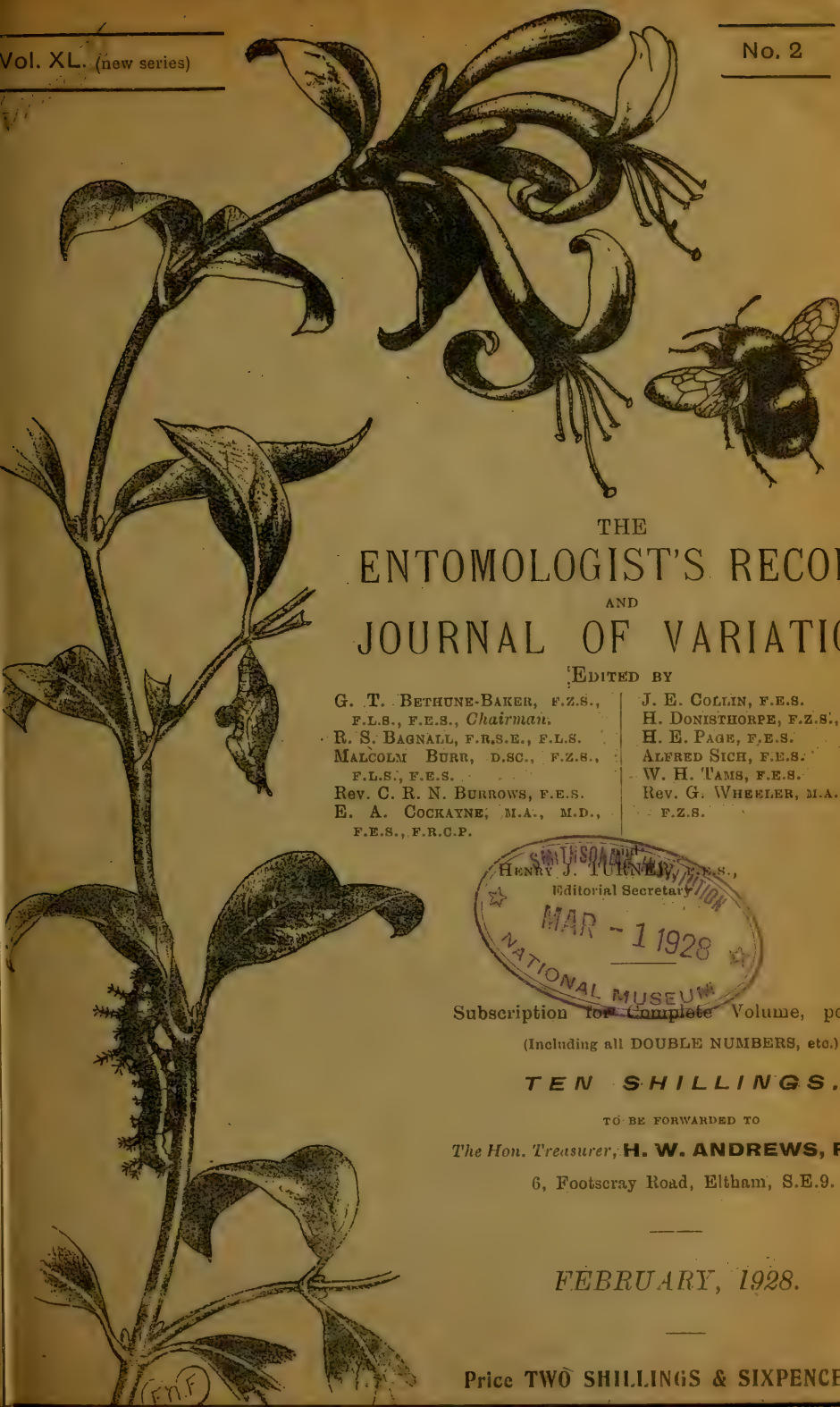
GENUS *Acronycta* and its allies.—Variation of *Smerinthus tiliae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthenis*, and *aurelia*—The Doubleday collection—Parthenogenesis—Paper on *Taenioctenipidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the Winter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist for 1890—Lifehistories of *Agrotis pyrophila*, *Eponda lichenea*, *Heliothobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc.: 360 pp.

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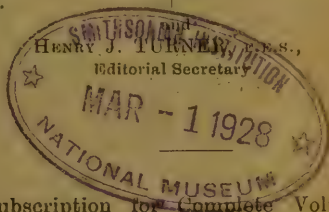


THE
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JOURNAL OF VARIATION

EDITED BY

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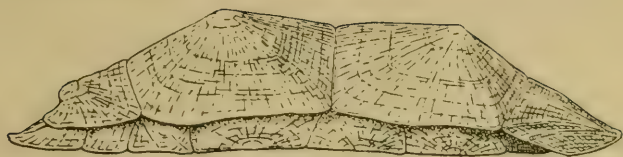
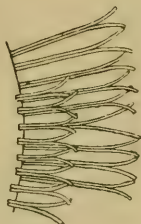


Fig. 6



a



b

Fig. 7



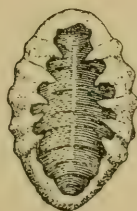
a



b



c



d

Fig. 8

The Entomologist's Record.

del. E. E. Green.

FIG. 6. *Parafairmairia gracilis*, $\times 15$.

„ 7. (a) *Asterolecanium bambusae*, $\times 15$; (b) fringe, $\times 150$.

„ 8. (a) *Eriococcus inermis*, $\times 3$; (b) *Eriococcus greeni*, $\times 3$; (c) *Eriococcus insignis*, $\times 3$; (d) *Gossyparia spuria*, $\times 9$.



The Entomologist's Record.

SOMATIC MOSAICS AND MUTATIONS.

Charles Darwin. A Sacrilege.

G. T. BETHUNE-BAKER, F.L.S., F.E.S.

The statue of Darwin has been removed from his place of honour on the stairs opposite the great entrance of the Natural History Museum, where he has sat for so many years—the Presiding Genius of that great Institution. Thus he has sat, the Inspirer of all the students of the Natural Sciences. Why this dethronement? We are told it is from the esthetic point of view: there are evidently two points of view on this matter. I know many think with me that the Statue, in its pure white marble, sat perfect in its surroundings; a rest to the eye, a lifter up of the soul towards greater achievement. Sir Richard Owen, whose erect dark bronze statue stands replacing that of Darwin looks dark and forbidding, quite incongruous in its surroundings, a figure to disturb, not to inspire.

It is much to be hoped that some more or less public protest be made so that this unfortunate action may be reversed.—G. T. BETHUNE-BAKER.

Somatic Mosaics and Mutations. (With plate III.)

By E. A. COCKAYNE, D.M., F.R.C.P.

For some years I have been very much interested in somatic mosaics in Lepidoptera, and in previous numbers of the *Entomologist's Record* I have published lists of the known examples and discussed the different ways in which they can be produced. Others are described and three of them are figured in this paper by the courtesy of Captain H. Phillips and Captain K. F. M. Murray.

The phenomenon is a very rare one and it is seldom that anything is known of the ancestry of such a specimen, though knowledge of this is essential before any certain conclusion can be drawn as to its mode of origin. Fortunately in the first case the ancestry is known. Some time ago the late Mr. G. T. Porritt called my attention to his paper in the *Entomologist's Monthly Magazine*, 1921, p. 134, in which he described an asymmetrical specimen of *Abraxas grossulariata*, L., and later he gave me an account of the circumstances under which it was bred and sent it to me to examine. The specimen is a male, or at least no female element can be seen by examination of the antennae, wings, and external genitalia. The wings on the left side are ab. *lunulata*, Porritt., a form with little or no yellow in the band and heavily marked with black, those on the right side are aberrational, a form with a very broad yellow band and reduced black markings. The strain in which it appeared was derived from a pair of ab. *lunulata*, bred from wild larvae taken near Huddersfield, and in the first generation these gave 75 per cent. ab. *lunulata* and 25 per cent. ab. *varleyata*. After some years inbreeding this mosaic specimen arose from a cross between a *lunulata* and a *varleyata*. The strain was continued and and was still in existence four years later in 1921. In the brood in which it appeared, a fairly large one, no specimen was bred with wings at all like those on the right side of the mosaic, nor did any appear in earlier or later generations. This form has not, so far as I know, been

named, but it is not uncommon in the locality. Unfortunately its mode of inheritance is not known. On the only occasion on which Mr. Porritt tried to breed it by crossing a male and female, both of this form, only three males emerged and all were like the parents. The result does not prove whether it is dominant or recessive. If the mosaic had originated from a binucleate ovum, others entirely of the aberrational form would have been bred in the same brood and in earlier and later ones, so that this possibility can be excluded. A somatic mosaic however often arises by a mutation of recessive character in the sex chromosome, but it can only occur in the females of Lepidoptera, because in the male the presence of a second sex chromosome prevents any change in external appearance even if such a mutation happens. This explanation cannot be the true one in this case because the mosaic is a male.

Theoretically it is possible for a somatic mosaic to be produced by the loss of an autosomal chromosome, but no actual example has been proved to have originated in this way, though experimental breeding has shown that a large part of one such chromosome may be lost without a fatal result. The absence of other specimens like the aberrational side of this one precludes the possibility that this example arose in this manner.

This *grossulariata* is almost certainly a somatic mutation, but the aberration must in that case be a dominant and the mutation may have happened in any of the chromosomes. If this is the true explanation it differs from most of the other lepidopterous mosaics. (Fig. 3.)

The second specimen is a mosaic of *Epirrhoe alternata*, Müll. (*sociata*, Bork.) taken by Captain H. Phillips at Cobham on June 8th, 1906. It is a male with the wings on the right side completely black, and those on the left typical except for thin black streaks on the hindwing. No entirely melanic example of this species has, so far as I am aware, been found, though if it occurred one would expect it to have been noticed in a locality so much visited by entomologists. (Fig. 2.)

The third mosaic is a *Tephrosia punctulata*, Schiff., taken at Bracknell by Captain K. F. Murray. It seems to be a male, though it has not been examined under a microscope. The wings on the right side are typical, but the thorax, abdomen, and the left forewing are unicolorous and nearly black. The left hindwing has a black stripe running across the middle from base to termen and another black area at the anal angle, the rest being typical. Captain Murray says he has seen hundreds of *punctulata* in the same locality, but he has never seen a melanic one, nor have I any knowledge of the occurrence of such a melanic form elsewhere. (Fig. 1.)

These specimens are interesting because they are males and in neither case is a melanic form like the aberrational parts of them known. These two facts make it improbable that they are derived from binucleate ova, and impossible that they are somatic mutations of recessive type. They are most likely somatic mutations, but if so the melanic forms must be dominants. In any case we shall probably find both these melanic forms sooner or later and their mode of inheritance can then be worked out and the nature of these remarkable somatic mosaics made clear.

The fourth mosaic is a female of *Spilosoma lubricipeda*. The wings on the left side are more unspotted both on the upper and under side

surfaces than most typical specimens, but those on the right are ab. *intermedia*, the radiation of both surfaces of the hindwing being particularly intense. The specimen was found on an out-house on June 14th, 1907, and had almost certainly escaped from the inside where a brood from Theddlethorpe was emerging. In this brood more extreme radiated forms as well as almost typical ones appeared. The specimen sold at Stevens' Auction Rooms, February 2nd, 1926, is now in Mr. Robert Adkin's collection. The fact that individuals, some like one side of the mosaic and others like the other side, were present in the brood makes it probable that it arose from a binucleate ovum. Federley has shown that radiation in *lubricipeda* is due to multiple factors and radiation of this degree seems to be due to more than one. This is an additional fact in favour of the hypothesis advanced above, because two or more mutations are much less likely to occur simultaneously than a single one.

At the Annual Exhibition of the South London Entomological Society in 1927, Mr. Castle-Russell showed a mosaic, a female of *Agriades coridon*, Rott., with the wings on the left side typical and almost devoid of blue scales on the upper surface, but with those on the right side ab. *semisyngrapha*, Tutt.

In my first paper I mentioned a specimen of *Colias croceus* with the wings typical on one side and ab. *helice* on the other shown by Mrs. Hemming. I have seen the specimen since and, though I had no opportunity to examine it microscopically, I think the white colour of the one side is due to a defect of the scales. The *C. philodice* recorded in *Psyche* is probably similar, and if so neither are true mosaics. On the other hand in Lord Rothschild's collection there is a female of *croceus*, which is undoubtedly a mosaic with one side typical and the other ab. *helice*.

In Mr. Porritt's paper reference is made to *grossulariata* with three wings ab. *nigrosparsata*, Raynor, and the fourth almost entirely typical, and to one with three wings ab. *nigra*, Raynor, and the fourth irregularly streaked with white, and I have seen a specimen with part of one hind-wing like ab. *varleyata* and the rest of the insect normal. There is also a record of a specimen with the left forewing almost black, presumably ab. *nigra*, and the other three wings normal (*Proc. Ent. Soc. Lond.* 1881. p. x.). Another mosaic of this kind is the *Papilio polyxenes* r. *asterius* with the underside of one hind-wing ab. *calverleyi*, Grote, recorded in the *Proc. South. Lond. Ent. Soc.* 1922-1923, p. 60. The much greater frequency with which in *Drosophila* only a small area shows the mutation than approximately half the insect, makes it probable that these are true somatic mutations.

Blaringhem describes a larva of *Bombyx mori* with the left side of the dominant zebra form, (ver rayé) and the right side of the recessive white form. It was the only somatic mosaic amongst 1,200,000 larvae bred in 1913. He states that in 1902 M. Coutagne among larvae from a cross between a white and a dark form (ver moricaud) there were three showing a mosaic of the two forms, none of which lived. These might have been gynandromorphs, but the phenomenon of a mosaic of colour unrelated to sex is well-known to silkworm breeders, though it is very rare.

Earlier in this paper I said that no wholly melanic form of *punc-*

tulata or *alternata* like the mutational part of either mosaic was known to me. It is even possible that none exists. It may be thought improbable that forms unknown hitherto should arise as mutations in a somatic rather than in a germ cell, but proof that they can do so has been given by Mohr, who found that a sex-linked recessive character, differing from any previously met with, appeared in this way in a specimen of *Drosophila melanogaster*, the ancestry of which was well-known. About half the insect showed the new mutation and it reappeared in the males of the second generation.

Offspring of other somatic mutations of *Drosophila* have been bred. Sturtevant records two *D. melanogaster*, each having one eye in part like the rest of the insect and in part like a well-known mutation. The mutant character was not inherited in either instance. Hyde also records two somatic mutations in which the eye was affected, the species being *D. hydei*. The first gave only one offspring like the major part of the insect, but the second, which arose between a typical male and a scarlet female, proved to be heterozygous for the recessive character that appeared in the eye and for the typical coloration.

In Coleoptera there are a number of records of mosaics taken wild; Chatanay, for example, mentions a *Zonabris variabilis* with the left elytron like a variety of *variabilis* and the other totally different and like a variety of *Z. prausta*. Most of our knowledge of mosaics in this order is due to the researches of Breitenbecher, who was investigating the genetical relationships of the various elytral colours in *Bruchus quadrimaculatus*, F. In the course of his experiments he met with 48 mosaics, all females, and offspring were obtained from 31 of them. In every case the mutation was a dominant and the progeny were all like the side with the recessive coloration. All the mutations occurred in autosomal chromosomes, and, if I am right, they are very similar to the three Lepidopterous mosaics described at the beginning of this paper.

In Hymenoptera, Whiting has investigated many mosaics in the parasitic wasps, *Habrobracon juglandis*, Ashmead, and *H. brevicornis*. Males in this genus usually arise from unfertilized eggs, but may arise from fertilized ones. Mosaic males were produced regularly but in varying proportions from the cross between a dominant black male with a recessive orange female, but much more rarely from the reverse cross. Most of these male mosaics were sterile, but when fertile they transmitted with one exception characters derived from the male parent only, or from the female parent only. The one exception transmitted characters derived from both parents. In addition to these mosaics five were from fertilized eggs. The mosaics in *Habrobracon* differ in origin from those in Lepidoptera and Coleoptera, and the causes are discussed very fully by Whiting to whose papers I give references.

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Noctuae and Vars. in 1927.

By A. J. WIGHTMAN, F.E.S.

The season 1927 appears to have been a good one for lepidoptera although I fully expect the continual rain has prevented many lepidopterists from doing much field work.

Being on the spot I was able to do a certain amount of collecting on all but the worst nights, and the following list of species taken within the county of Sussex between March 11th and October 21st could have been considerably increased had I been minded to go further afield for other species rather than work for forms.

Acrioneta leporina, *A. aceris*, *A. megacephala*, *A. tridens* (larvae), *A. psi*, *Craniophora ligustri*, *Metachrostis perla*, *Agrotis segetum*, *A. corticea*, *A. cinerea*, *A. puta*, *A. tritici*, *A. exclamationis*, *A. ypsilon* (suffusa), *A. strigula*, *Noctua augur*, *N. glauca*, *N. castanea* (larvae), *N. baia*, *N. c-nigrum*, *N. triangulum*, *N. brunnea*, *N. primulae* (festiva), *N. rubi*, *N. umbrosa*, *N. xanthographa*, *N. plecta*, *Axylia putris*, *Triphaena comes*, *T. pronuba*, *T. jimbria*, *T. janthina*, *T. interjecta*, *Aplecta prasina*, *A. nebulosa*, *Mamestra brassicae*, *M. persicariae*, *Hadena oleracea*, *H. genistae*, *H. thalassina*, *H. pisi*, *H. nana* (dentina), *Dianthoecia conspersa* (larvae), *D. capsicola* (larvae), *D. cucubali* (larvae), *D. carpophaga* (larvae), *Hecatera serena* (larvae), *Neuria reticulata*, *Neuronina popularis*, *Luperina cespitis*, *Erenobia ochroleuca* (larvae), *Luperina testacea*, *Cerigo matura*, *Mamestra abjecta*, *M. sordida*, *Apamea gemina*, *A. basilinea*, *A. unanimes* (larva), *A. secalis* (didyma), *Miana strigilis*, *M. fasciuncula*, *M. literosa*, *M. bicoloria*, *Xylophasia rurea*, *X. lithoxylea*, *X. sublustis*, *X. monoglypha*, *X. hepatica*, *Dipterygia scabriuscula*, *Aporophylla lutulenta* (larvae), *Miselia oxyacanthae*, *Agriopsis aprilina*, *Euplexia lucipara*, *Phlogophora meticulosa*, *Hydraecia nictitans*, *H. micacea*, *Gortyna ochracea*, *Mania maura*, *Nonagria sparganii* (pupae), *N. typhae* (pupae), *N. geminipuncta* (pupae), *Coenobia rufa*, *Senta maritima* (larvae), *Tapinostola fulva*, *Calamia lutosa*, *Leucania phragmitidis* (larvae), *L. obsoleta* (pupae), *L. impudens* (larvae), *L. pallens*, *L. impura*, *L. straminea* (larvae), *L. comma*, *L. lithargyria*, *L. conigera*, *Grammesia trigrammea*, *Caradrina morpheus*, *C. taraxaci*, *C. quadripunctata*, *Petillampa arcuosa*, *Rusina tenebrosa*, *Amphipyra pyramidea*, *Panolis griseo-variegata* (pini-perda), *Pachnobia rubricosa*, *Taeniocampa gothica*, *T. miniosa*, *T. pulverulenta*, *T. stabilis*, *T. incerta*, *T. munda*, *T. gracilis*, *Calymnia pyralina*, *C. diffinis*, *C. trapezina*, *Dyschorista fissipuncta* (ypsilon), *Omphaloscelis lunosa*, *Amathes lota*, *A. macilentia*, *A. circellaris*, *A. lychnidis* (pistacina), *Cirrhia citrargo*, *Ochria aurago*, *Xanthia lutea* (flavago), *X. fulvago*, *Xantholeuca croceago*, *Orrhodia vaccinii*, *O. ligula* (spadicea), *Scopelosoma satellitia*, *Xylina semibrunnea*, *X. socia*, *X. ornithopus*, *Xylocampa areola*, *Calocampa retusta*, *Cucullia verbasci* (larvae), *C. scrophulariae* (larvae), *C. asteris* (larvae), *C. gnaphalii* (larvae), *C. chamomillae* (larvae), *C. umbratica* (larvae), *Anarta myrtilli* (larvae), *Erastria fasciana*, *Hydrelia uncula*, *Gonoptera libatrix*, *Habrostola*

tripartita, *Plusia moneta* (larvae), *P. chrysitis*, *P. festucae*, *P. iota*, *P. gamma*, *Euclidia mi*, *E. glyphica*, *Catocala nupta*, *Toxocampa pastinum* (larvae), also the following species, which are often excluded from the Noctuae, but which I treat as Noctuae, *Habrosyne pyritoides* (*derasa*), *Thyatira batis*, *Palimpsestis octogesima*, *P. duplaris*, *Asphalia diluta*, *Polyplocia ridens* and *P. flavicornis*. Several of the above species were also bred from larvae taken in the previous year, and I received from a friend in Yorkshire a nice batch of larvae of *Nonagria dissoluta* which produced a number of fine forms, while a trip to Norfolk in July enabled me to take pupae of *N. cannae* and larvae of *Dianthoeicia irregularis*, were taken in Suffolk on the way.

From among the foregoing the following forms were obtained.

Taenioecampa gracilis, Fab.—*rosea*, Tutt, *rosea-sparsa*, Tutt, *pallida*, Steph., and *sparsus*, Haw. None of the specimens had a bright yellow subterminal line as in the type, but one individual has a reddish edging to the grey subterminal. The most interesting form obtained is deep ochreous brown, the usual markings being darker and clearly defined; the insect is fully as deep in colour as the well-known New Forest forms (*rufescens*, Ckll.), but is without any trace of red. All were taken at sallow bloom on a marsh near Pulborough, Sussex. [This is ab. 2. Hampson, *Cat. Lep. Phalaenae*, V. 431. (1905) subsequently named *obscurior* by Strand, *Arch. Naturg.* LXXXII. A. 2. p. 30. (1916).—Hv.J.T.]

Dianthoeicia carpophaga, Bork.—*pallida*, Tutt, *ochrea-pallida*, Tutt, *fusca-pallida*, Tutt, *ochracea*, Haw., *virgata-ochracea*, Tutt, *lepida*, Esp., were all bred from East Sussex larvae taken in 1926, and several interesting forms apparently unknown to Tutt have made their appearance.

(1) A white form like *pallida*, Tutt, except that instead of the outlines of the stigmata being the only markings, these are obsolete, the only markings being the inner and elbowed lines, while the inner edge of the cilia is deep brown. It is very unlike form *pallida* to look at, yet as white and as lightly marked.

(2) A white form in which nearly all the markings are obsolete in the inner and outer areas, and the centre area deep red brown on which deep background the stigmata shew up clearly in paler brown. The insect is much like the form figured in Newman's *Butterflies and Moths*, p. 385. fig. 3, but with less markings in inner and outer areas. According to Tutt, *Brit. Noct.* III. p. 31, this figure represents his var. *ochracea-virgata*, which has an ochreous ground colour. My two insects have pure white ground colour and are the banded form of *pallida*, Tutt. Had Tutt possessed this form he would have called it **virgata-pallida**. I have bred many thousands of *carpophaga* from the pale Sussex races (colonies, not subspecies) and have a picked series of 250, but have never seen the extreme white and red-brown form before.

(3) A bright yellow ochreous form, with all the usual markings obsolete except the inner and elbowed lines, but the edging to cilia is much paler than in the corresponding white ground colour form above (no. 1).

Many so-called white *carpophaga* forms, when compared with the true white forms are seen to be pale ochreous in colour, and these pale ochreous forms, nearly devoid of markings, are much more plentiful

than the white forms without ochreous tinge. I have one such form without any markings whatever.

Dianthoeccia conspersa, Esp.—A good number of this species bred from 1926 East Sussex larvae produced two distinct forms, both of which however would be classed as the type form. One has the ground colour snow white and the markings black, the other has the edges of the black markings tinged with ochreous. The only really extreme form is a ♂ which agrees fairly well with the figure of *compta* in South's *Moths of Brit. Is.*, Vol. I., plate 124, fig. 2, but there can be no doubt that my specimen is a form of *conspersa* on which the black markings are almost restricted to the inner and outer areas. Tutt calls this form var. *fasciata*.

Senta maritima, Tausch.—*bipunctata*, Haw., *nigrostriata*, Stdgr., *wismariensis*, Schmidt., and *ulvae*, Hb. In Sussex the pale type is much the most plentiful form and *ulvae*, Hb., the rarest we get. I have never seen the form *nigrocostata*, Stdgr. With this species it is possible to tell nearly a week before emergence what form a pupa will produce, the markings showing clearly through the wingsheaths. Bred from wild East Sussex larvae and pupae.

Nonagria sparganii, Esp.—A batch of East Sussex larvae and pupae produced the forms, *obsoleta*, Tutt, *bipunctata*, Tutt., and *rufescens*, Tutt., also a great many far more striking colour variations than the forms mentioned above, the most extreme of which is rich copper red with the same limited markings as in the type. This species appears to have something of a local facies in all its Kent and Sussex stations and is without doubt the most variable species in the genus.

Nonagria cannae, Och.—A number of larvae and pupae taken in Norfolk produced the indian-red, golden yellow, and dull brown forms, while one very large ♂ is of so deep a shade of smoky brown as to appear black. [This is probably ab. *fumata* of Warr. (Seitz).—Hx.J.T.]

Nonagria typhae, Thnbg.—A number of the form *fraterna*, Fr., were bred. The colour varied from rich ochreous red with distinct markings to deep red brown with a heavy suffusion of black scales and all markings lost in ground colour. Several of these deeper brown forms are females which disproves Tutt's statement that the black females are the same form as the red-brown males, the difference being sexual, *Brit. Noct.* Vol. 1., page 54.

Two large black females with short white longitudinal lines were bred from the same locality as the red-brown females. Norfolk Broads.

Nonagria dissoluta, Tr.—A batch of Yorkshire pupae produced much larger insects than those usually obtained from Kent or Sussex. This species is very much more variable than its congener *N. neurica*, Hb. (which seems to have but three forms, the type, a blackish form and a rosy form). These Yorkshire insects are very different from the Cambridge forms I have seen, and in addition to the black type, forms *arundineta*, Schmidt, *rosea*, Tutt., and a nice yellow ground colour form with very few markings were bred with a number of specimens intermediate between *arundineta* and *rosea*.

Tapinostola pygmina, Haw. (*fulva*, Hb.).—The pale form which Tutt insisted on calling *concolor*, Tutt, was taken freshly emerged with the following other forms, *ochracea-suffusa*, Tutt, *ochracea*, Tutt, *punicea*, Tutt, *pallida*, Steph., *pygmina*, Haw. Marsh near Pulborough.

Leucania impudens, Hb.—*pudorina*, Hb., *rufescens*, Tutt. and a single specimen which agrees well with form *striata*, Dobrée, described from a specimen from the Amur. Marsh near Pulborough.

Leucania obsoleta, Hb.—*grisea*, Tutt, and a greyish ochreous form with the markings nearly obsolete.

Leucania impura, Hb.—Among a number of what is usually considered the type form, I bred a single form *punctilinea*, Tutt. According to Tutt, *Brit. Noct.*, Vol. 1, page 40, we do not get Hübner's type, our form being *fuliginosa*, Haw.

Leucania straminea, Fr.—*intermedia*, Tutt, *rufolinea*, Tutt, *nigrostriata*, Tutt, and a single specimen of *obsoleta*, Tutt. Reed beds of East Sussex and marsh near Pulborough.

Hecatera serena, Fb.—This species varies a good deal in Sussex, and I have quite a number of minor forms, but extreme forms are rare, the most important of those I have bred this year are:—

1. A form with very white inner and outer areas, almost devoid of markings. The central area very deep black edged with yellow.

2. A form in which the central area is more grey than black and much broken with white markings. Brighton.

Parocampa pastinum, Fr.—A few of the form *pallida*, Tutt, were bred with the typical form. Marsh near Pulborough.

Aporophylla lutulenta, Bkh.—The larva of this species is usually described as being marked in some way with purple or red, Buckler. *Larvae British Butterflies and Moths*, Vol. VI., *Noctuae* part III., plate XC., figures five forms and all have red markings. Yet, as far as my experience goes, the brightly marked forms are rare. The usual form in Sussex may be described as:—

Smooth, nearly cylindrical; head and body bright, rather transparent green (much like *meticulosa*); medio-dorsal line rather darker than ground colour; subdorsal lines pale whitish-green; no perceptible line along the spiracles, which are white, finely edged with black; below these a rather wide stripe of palest green tinged with yellow, edged both above and below with white; belly, legs and claspers green, 85% of bred and taken larvae agree with above description, about 10% have a scarlet or violet line along the spiracles and only 5% are richly marked with red. One I took had a scarlet medio-dorsal line, scarlet stained belly and claspers, while the spiracular line was wide and of a rich purple-red colour.

From these larvae I bred the typical form, and forms, *lüneburgensis*, Fr., *sedī*, Gn., *consimilis*, Steph., while two females are of the same hoary grey colour as *sedī*, but the central area is little darker than the rest of the wing, the markings of the whole wing being sharp and distinct. Three others are of the typical colour, but have the central area so black, that the insect is seen to be banded, not in certain lights, but in any light. Elevated common near Pulborough, Sussex.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

VI. IN THE HIGHLANDS.

Here we are in the highlands of Angola, part of the great plateau of southern Central Africa. It is a fine bracing country of rolling hills, several thousand feet above the sea, with scrubby forest alter-

nating with open grassy savannah, cut by numerous small streams that feed the rivers that run on the one side into the Congo system and so into the Atlantic, on the other into the Zambesi, and so into the Indian Ocean, for we are on the watershed of these two great drainage systems.

It is a country of soft friable reddish sandstones, covered over big areas by a thin crust of laterite; as the air from April to October is excessively dry, so that tobacco turns to dust as in Siberia, and there is no lime in the place, it should be free from rheumatic complaints; there is no talk of sleeping sickness up here and but little of malaria.

This month of May is the autumn here and the nights are cool, but in a month or two they will be really cold and there will be ground frosts; the tropics thin one's blood, and life and costume is not organised for frosts, and I am feeling more afraid of one degree of frost here than I was of eighty, ninety or even a hundred in Siberia, scarcely more than a year ago.

Every evening I take the net and do some sweeping in the scrub around the camp, or alongside the marsh-edged river near by. Although it is the autumn, the seasons here are all mixed, for the majority of the Orthoptera are immature and there are many that have only recently hatched out; every sweep of the net produces half-a-dozen *Pyrgomorpha* in the nymph stage and I have difficulty in finding mature individuals; Mantids and Locustids too are mostly immature, so for a change time is on my side and I look forward to interesting collecting during the coming months.

Years ago I would have gone wild with delight at the thought of seeing those strange little grasshoppers the *Eumastacidae* alive in a state of nature, yet now I am already accustomed to them; I have found no more of those *Penichrotes* that I saw at Huamba, but there are plenty of *Thericles*. The green one with white flanks is the commonest and I have taken but three more of the smaller marbled one, which seems to be structurally distinct. They are so small and apterous that it is not always easy to be sure they are adult. They are powerful jumpers, and a tiny *Thericles*, if it leaps vertically, will jump clear out of the net, and they are difficult to catch. When viewed dorsally, the green one presents a dark median line, true to the general longitudinal pattern of most of the Orthoptera in this grassy country. But they are so small and nimble that they can hardly be seen when sitting on the grass and can only be found by sweeping. The green femora coincide with the grass and only the darker dorsal stripe stands out when seen from above; viewed from the side, the white banding and mottling stands out, perhaps to represent the droppings of a small bird, and the upcurled tail of the male may help the illusion.

The resemblance of those strange, elongate, narrow grasshoppers which I may call provisionally *Mesops*, to grass is astonishing; I have seen four species; the one taken at Loanda was big and dusky, but looked like a swelling on the thin grass on which I saw him when he gave himself away by stridulating; the three found here are half his size; one is brown with clear wings, the other buff beneath but black above, with reddish wings hidden under the dark elytra; the boundary between the two colours is sharp and striking and helps to conceal him among the grass, as the stripes of a tiger among the reeds; another species, with a different head, I have found only in the nymph

stage; the colours are pink and green, but equally sharply divided and arranged in the same way.

The larger Acridians are all immature, mostly in the nymph stage, but the Oedipodids are fully grown and the yellow flash of an *Oedaleus* is common, as well as the red or yellow of that common African species with ribbed and pointed pronotum; red seems the commonest colour of his wings but I have taken some yellow and seen more; this seems to be a form of albinism, for I have found several of an intermediate orange tint, as though the red pigment failed; the same phenomenon is known in our European species.

The nightly chorus of crickets recalls that of southern Europe and I think I hear the familiar voice of the field and mole crickets, but there are strange species among them; they are however very difficult to collect as they are so wary and are lively only at night. Last evening I heard an undoubted Locustid song; it was penetrating rather than loud, so I took a lantern and followed it for several hundreds of yards without feeling that it was appreciably nearer; at last I ran it down to a shrub and listened intently to locate it; suddenly I felt as though something had brushed my ear, and raised my arm to wipe off a passing beetle, as I thought; it was a deep drone; then I heard it again and it was so intense that it almost hurt my drums; I turned my head and it seemed distant again. Then I found that it was the note of this Locustid with this peculiar property; if I stood facing the singer, which was clearly quite close, the sound seemed as remote as when I had first heard it several hundred yards away; but when I turned my head sideways, the effect was startling and I could feel the air vibrating in my ear, so that it almost hurt, and seemed to be touching me. But my movement frightened the creature and it fell into an obstinate silence that surpassed my own patience. I look forward to identifying this strange musician.

I have not yet been lucky with earwigs. I have turned over dead logs, risking scorpions and snakes; I have ripped old bark off trees and done everything I should in the hope of taking some of the African Dermaptera, many of which are extremely interesting. But all I have found have been two common and well-known Ethiopian species, both by sweeping grass at dusk, *Forticula senegalensis*, Serv., a well grown rather dark male, and three males of *Diaperasticus erythrocephalus*, Oliv., one of which is brachypterous. Both species are common in collections and occur practically throughout the continent south of the Sahara. The latter extends into Madagascar and some of the adjoining islands.

It is rather surprising to find small grasshoppers abundantly here, which seem scarcely distinguishable from two of our commonest European and British species; one is very similar to our abundant *Chorthippus parallelus*; as in that species, the female has the elytra reduced to flaps, and it haunts longish grass near wet places: the other is a dingy fellow recalling the almost universal *Stauroderus bicolor*, and frequenting dry scrub like that species.

I am looking forward to the ripening of the Locustids; the only full grown species which I have found up here is what I think is *Phaneroptera nana*, and there are apparently none of that handsome and distinguished species which is common at Loanda. But there is a very promising larva; it is fat and tubby, with a compressed figure

and feeble legs; it is green, but the dorsum is marked with a sharply defined dark, blackish spot; when viewed from above as it sits on a blade of grass, the green of the sides and legs blends with the herbage and only the black dorsal spot is noticeable; it looks like anything but an insect, and might be a piece of dirt or discoloration on the grass. Apart from the Oedipodids this is the most striking exception of protective coloration that I have noticed here, which does not follow the general longitudinal pattern; at the same time, the figure is squat and stumpy instead of svelte and elongate. But the result of concealment seems to be equally well obtained.

SCIENTIFIC NOTES AND OBSERVATIONS.

HOMOPTERA DEVoured BY A BIRD.—At a recent meeting of the Entomological Society of London, my friend Mr. Eltringham gave an account of some attacks by birds on Lepidoptera, and he said that all such occurrences should be put on record. This no doubt holds good with other insects as well as Lepidoptera, hence the following note. On June 20th, 1927, at 6.30 a.m., I was looking out of my bedroom window into the garden when I noticed a starling, which settled on a lavender bush, all covered with "cuckoo-spits." It proceeded to deliberately pick out from the froth all the larval Frog-hoppers, and eat them. I should think this is not a very usual proceeding, as otherwise a flock of Starlings would clear a garden in a very short time, and none of the insects be left. The late Dr. Sharp did, I believe, say that the object of the froth was to attract a wasp, which preyed on the Frog-hoppers! This, however, is not the view usually held by scientists.—HORACE DONISTHORPE.

NOTES ON COLLECTING, etc.

NOTES ON THE SEASON 1927 IN ESSEX AND SUFFOLK.—There was nothing of interest to record before May. About the middle of the month an exhaustive search for *Euchloris smaragdaria* on the portion of the Essex coast between Mersea and Tollesbury was unrewarded. In the previous season the species was well established north of the River Colne on a particular stretch of *Artemisia* where Mr. B. S. Harwood and his father had found it over 20 years ago. In September, 1927, in company with members of the Essex Field Club, 16 larvae were obtained at Canvey on a patch of *Artemisia* not more than 3 yards square, no doubt the progeny of a single female. These larvae were transferred to a large plant of *Artemisia maritima*, growing on the sea-wall near Virley, Essex, and I trust have survived the recent severe flood. In searching the *Artemisia* at Tollesbury I found a larva of *Lithosia complana* feeding, this was reared to the perfect insect on lettuce. May 24th, found Harwood and myself at Brightlingsea and Wivenhoe. The abundance of web-forming larvae was noteworthy, such species as *Malacosoma castrensis*, *Lachneis lanestris* and *Trichiura crataegi* were unusually abundant; a nearly full fed specimen of *Eutricha quercifolia* was found on black-thorn and the Psychid *Epichnopteryx reticella* occurred on the sea-wall. At Tuddenham on June 4th, a single *Heliothis*

dipsacea was netted—an exceptionally early date for the species, which was not found again later on owing to the inclement weather. *Bankia argentula*, *Hydrelia uncula* and *Phytometra viridaria* were out on the same day in a fen on the Cambs.—Suffolk border; the first two species were still in good condition on the 20th inst. and *Taenioctampa gracilis* larvae were common on *Spiraea*. At Brightlingsea, June 25th was a dull and windy day, *M. castrensis* were now nearly full grown and *Adactylus bennettii* and *Catoptria tripoliana* were netted on the saltings. I was away from home during July and part of August; on the 24th of the latter month a few *Cucullia asteris* larvae were found near St. Osyth and on the following day a visit to Fleam Dyke near Newmarket proved that *Polyommatus coridon* was abundant, the only vars. worth mentioning being one approaching *semi-syngrapha* and one *postico-obsolita*: *Eremobia ochroleuca* was also common but worn. At Royston on the 29th inst., a fine warm day, *P. coridon* was only moderately abundant in a few spots and no vars. were seen. A few *Urbicula comma*, *Plebeius medon* (*astrarche*) and larvae of *Eupithecia subumbrata* on *Centaurea* made up the total bag. On the way home several *Euphyia cucullata* (*sinuata*) larvae were swept from *Galium* and a subsequent visit on September 9th to the district between the Suffolk border and Newmarket proved that the species is generally distributed on the chalk in that area.

In the same fen which we had worked earlier in the season, a search was made on September 2nd for *Coenoteophria sagittata* larvae on *Thalictrum* without success. However we were not without some reward as a larva of *Arsilonche alborensa* was obtained by sweeping reeds, etc., and *Notodonta dromedarius*, *Dasychira pudibunda*, *Drepana falcataria* and *Lophopteryx camolina* were obtained from birch and willow. A short time was spent at Tuddenham on the way home where *Crambus geniculatus* was common and a late female of *Acidalia* (*Leptomeris*) *rubiginata* was netted. This laid 3 or 4 dozen ova, commencing to hatch on the 22nd inst., the larvae are now in hybernation about $\frac{3}{16}$ " long. The only specimen of *Colias croceus* (*edusa*) noticed was at Canvey, Essex, on September 10th.—W. S. GILLES, F.E.S., F.C.S., Bocking, Braintree, Essex.

CINORINUS VARIABILIS IN WINDSOR FOREST.—In 1830 Stephens recorded that this fine "Chafer" was found annually in decayed oak trees in some plenty, near Windsor, by the Messrs. Greisbach.

In 1890 Fowler gave Windsor Forest as one of its localities in England, but said it had not occurred there for a long time past. It was, however, taken (1886-1892) by Mr. J. C. Bowering, of Forest Farm, Windsor Forest, on oak trees in his garden, and also from an oak tree, which had been blown down in the Forest. It was not found again in this locality until 1925, when I succeeded in rediscovering it on July 24th of that year. For some time previously I had been hunting for this beetle; I had described it to the forester, and woodmen, but they could not remember ever having seen anything like it. I then borrowed a set specimen to show, and said it should occur in the forks of old oak trees. Having pointed out a likely tree, a ladder was lent to me, and on mounting into the tree I at once found a fine large female *G. variabilis* resting on the black wood mould in the fork. On digging into this mould, a number of the larvae of the beetle was

found. When I showed the adult beetle to the forester, he asked to see the box with the set specimen in again—I am sure he thought I had brought the live one with me! The larvae were taken home and placed in a glass bowl with a quantity of the wood mould, where they at once burrowed beneath the surface. On June 24th, 1926, they were dug up, when a certain number of perfect insects, and several cripples were found to be present.

In 1926, larvae and pupae and a few imagos were found in other trees. The presence of these larvae can at once be detected by the number of their large droppings, with which the mould is full. The larvae are very tough, but the pupae are exceedingly delicate, and as they pupate close to, and in, hard ridges of wood beneath the mould, they are easily injured.

On June 5th, 1927, a large oak tree had to be cut down, and as I knew it was inhabited by this beetle, it was arranged that I should be present. After the tree had been felled, thirty imagos, a number of pupae, and over a hundred larvae were secured. If the pupae be fitted into an oval shaped cell in wood mould in a soap dish, or other suitable receptacle, in which it fits tightly, it will be successfully reared, if it has not been previously injured. It is thus able to get rid of the pupal skin, otherwise it will be a cripple.

Two curious specimens were reared from pupae taken in the felled tree. One of these had the joints of the left front tarsus all soldered together in a club, and the clypeus and mouth parts were deformed; the other was perfect with the exception that the left front tibia remained a bright red, and part of the alimentary canal was exposed, and was never withdrawn. I imagine these peculiarities were due to the shock to the pupae caused by the falling of the tree.—HORACE DONISTHORPE.

COLEOPTERA AT ABERLADY IN THE SPRING.—A favourite collecting spot which I usually visit three or four times each spring is a pond on the Aberlady links; the pond is almost choked with a luxuriant growth of aquatic vegetation, and the edges are lined with thick moss and sphagnum. Most of my captures are made by pulling up this moss and sifting it over a sheet. Last year I made a visit on February 26th and another on March 26th; on these visits beetles were by no means common. Other two visits were made on April 18th and 30th; on both of these occasions I found all the species which usually occur there in profusion. The following list contains mainly the names of those species which are more or less local in their distribution, and those which were very abundant. *Anchomenus gracilis*, Gyll.; *Homalota clavipes*, Shp.; *Gymnusa brevicollis*, Payk., *G. variegatus*, Kies., both common; *Myllaena dubia*, Grav., *M. infuscata*, Math., both abundant; *Philonthus corvinus*, Er., *P. micans*, Grav., both not uncommon; *Gabrius trossulus*, N., rare; *Actobius cinerascens*, Grav., scarce; *Lathrobium terminatum* v. *atripalpe*, Scriba, not scarce; *Stenus juno*, F., *S. paganus*, Er., *S. tarsalis*, Ljungh, *S. pallitarsis*, Steph., *S. ossium*, Steph., all abundant; *S. atratulus*, Er., rare; *Trogophloeus elongatulus*, Er., abundant. Other species which turned up by single specimens were *Phyllotreta flavosa*, Ill., *Iacobius alutaceus*, Th., *Lesteva sicula*, Er., *Lathridius lar larius*, De G., *Corticaria denticulata*, Gyll., *Aphodius scybalarius*, F.—SIR T. HUDSON BEARE, (F.E.S.) 10, Regent Terrace, Edinburgh, January 21st, 1928.

COCCINELLA BIABILIS, MARRINER.—A few days ago, while putting away in my cabinet some recent captures of varieties of various species of this genus, I examined my exponents of this hybrid form described by Mr. T. F. Marriner (*Ent. Record*, 1926, p. 81). I found I had one with the dark legs of typical *bipunctata*, taken in Harewood Forest in June, 1905, and eleven specimens with the red legs of *10-punctata*—one of these was taken in Richmond Park hibernating in the winter, three in the New Forest in the months of May and June, two at Ashted in May, three in Dalmeny Park, Edinburgh, in June and September, and two at Dunkeld, Perthshire, in June.—(SIR) T. HUDSON BEARE, (F.E.S.), 10, Regent Terrace, Edinburgh, *January 21st, 1928.*

BREPHOS PARTHENIAS AB. FLAVA, WOOD.—I have seen British examples of this species, in which the hindwings were yellow, but there was an orange tint still remaining and the forewings had the usual reddish suffusion. Hennin does not make it clear whether his ab. *luteata* is this form or the very different ab. *flava*, Wood., and until his description has been amplified, or Belgian specimens have been sent for comparison I think it is unsafe to sink ab. *flava*. Wood has bred the aberration, so that the possibility of fading or discoloration can be dismissed in the case of ab. *flava*.—E. A. COCKAYNE, A.M., F.E.S.

[Both names register the same scientific principle, that is the change of orange-red into clear yellow and it matters not whether a few scales, more or less, have not been affected by it. Very rarely are two examples of an aberrant form identical and the naming of grades of perfection in this and similar cases seems unnecessary. Tutt's colour names were usually given to a series, not to an individual, in which there was a great diversity of depth of colour; his *brunnea*, *flava*, *rubra*, etc., each meant a series in which the colour prevailed over all others in varying degree and it might be that no specimens were alike in degree of the colour.—HY.J.T.]

REVIEWS AND NOTICES OF BOOKS.

We have received a remarkable separate from the illustrious zoologist Dr. Holland of the United States, entitled "Exit Huebner's Tentamen."

Some years ago, a decade or more, Mr. J. H. Durrant gave an account of this famous broadsheet in our magazine and a very closely detailed comparison with the *Verzeichniss* of the same author. To this Mr. Bethune-Baker added a few remarks. Unfortunately we were unable to persuade Mr. Durrant to add to his article an adequate history of the appearance of this much contested publication.

Practically all those entomologists, who have thoroughly investigated the matter have decided on the acceptance of the *Tentamen*. That great entomologist Scudder, Dr. Holland's compatriot, deals clearly with the work, and recalls that the substance of it is reproduced in the preface to the first century of Hübner's *Zuträge*, and is stated to have been issued in 1806. Also that in a book list produced by Geyer, who continued Hübner's works after his death, the *Tentamen* is included as one of the works of that author. (See Scudder, *Historical Sketch*, p. 98, 1875.)

The *Tentamen* had been accepted as a nomenclatorial item practically universally, but recently an International Commission on Zoological Nomenclature has butted in and gives an "opinion" that there was no valid issue of the sheet, and that it has no nomenclatorial value, and should henceforth be discarded. It seems like the "tail wagging the body," for a committee, on which entomology has only a comparatively infinitesimal representation, to dictate on matters of which they have little or no knowledge. When we consider the almost overwhelmingly innumerable objects comprised in the range of entomological study compared with the comparatively small number under the purview of other zoologists, such a dictation is absurd. The entomologist can study thousands of *Drosophila* (for instance) in one year, while your zoologist would be fortunate if he could study a hundred elephants in a life-time.

It is a great pity that the general zoologist cannot leave the entomologist to settle what is purely a concern of his own. No! The entomologist will regulate his own classification and nomenclature for himself, and has already begun to take matters in his own hands with National Committees and a series of International Congresses, Brussels, Oxford, Zurich, and this year the States.

Examining Dr. Holland's paper in more detail, we note the boast that he has "the entire literature of the subject at my finger-tips." Yet he either carelessly or ignorantly quotes the date of Hübner's *Verzeichniss* as being published in 1816. Although this work has that date on the title-page, from irrefutable evidence, both internal and external, we know it was published in sections at various dates from 1816 until after 1825 (teste Sherborn, Prout, Durrant, etc.)

It is very evident from all the known circumstances that the issue of the *Tentamen* by Hübner was primarily a matter of *classification* and only incidentally has it become a matter of *nomenclature*. He, Hübner, did *not* ask his friends on matters of nomenclature, but emphatically on his proposals for classification, to use Dr. Holland's phrasing, "to fix, arrange and name the individual races of lepidoptera." Throughout his paper Dr. Holland confuses the issue by jumping from nomenclature to classification and vice-versa. For instance, he quotes a letter of Dr. F. A. Bather, of the British Museum, one of the leading authorities of the day on microscopic marine zoology. "I think it is perfectly awful to decide that a man can not ask the opinions of his friends as to the value of certain names without being thereby committed to them eternally." It is strikingly obvious that Hübner did *not ask for opinions on his nomenclature*, but on his proposed classification; a very different thing. The question (Dr. Holland's) was calculated to mislead, and the quotation is absolutely beside the mark.

In fact the "red herrings" used, range from a reference to the life of Christ in the Gospel of St. Matthew, to the extraordinary action of a croupier at Monte Carlo in striving to snuff off a too ardent player.

The Doctor is equally unfortunate in his comparison of the *Tentamen* with the *Verzeichniss*. No one uses *Nereis* (*Tent.*). It is used in Worms (Linn.) and therefore not available. Ochsenheimer is the only author who copied the *Verz.* and put *chrysippus* in *Euploea*. It is generally agreed to put it in *Limnas* (*Tent.*). According to the old Rules of Nomenclature *Melitaea* (*Tent.*) is pre-occupied by the similarly spelt *Melitea* and is not available (a rule not kept rigorously). In America *Lemonias* (*Verz.*) is used while *Melitaea* is kept for the Old

World species. Surely Dr. Holland knows that no one proposes to call the usual *Argynnis* species by Hübner's *Dryas* (*Tent.*). *Dryas* is reserved for *paphia* (*Tent.*) and a few very closely allied species like *pandora*, etc., and so on.

In the early 19th century entomologists seemed to amuse themselves by all kinds of alteration (correction, etc., they styled it) both of previous names as well as their own. Fabricius was one of the earliest and one of the worst. Haworth was another. Only gradually did entomologists work up into a state of recognising absolute priority as the sole guide to stability. Hence our present nomenclatorial trouble, intensified as it is by the pseudo-conservatism which sticks to the alterations instead of going back to the originals, most of which were unearthed and ably pointed out by W. F. Kirby and others more than fifty years ago.

No! we entomologists do not admit "Exit Huebner's *Tentamen*." The more we have to deal with it the stronger is the case for its continued recognition. Many a time has my dear old friend Tutt said to me "Hübner knew his bugs."

P.S.—I do not think that there is an original copy of the *Tentamen* in the United States, nor is there one in the British Museum. However, my copy, with a copy of Scudder's facsimile reprint, a copy of Tutt's reprint and with Durrant's comparison with the *Verzeichniss* will eventually find a resting-place in the latter institution.—Hy.J.T.

THE ORIGIN OF INSTINCT.—E. Bugnion, Published by Kegan, Paul, French, Trubner & Co., Ltd., Price 5/-.

Seeing that Educational Psychology is now a matter of intense interest in certain scientific circles, this monograph (the first of 'Psyche' series) will receive a hearty welcome from most students.

The present study was originally written by Professor Bugnion of the University of Lausanne, as an appendix to Part 4 of Forel's monumental work *The Social World of the Ants*. The translation is by C. K. Ogden.

Studies of *Termes redemanni* and *T. obscuriceps* were made in Ceylon in the course of 4 consecutive winters 1909-1913 and most interesting observations are chronicled.

The author treats of the Genesis of Instincts and says "If it be true that the origin of instincts was lighted by a ray of intelligence, a reasoned and conscious form of action, and that these reasoned actions, many times repeated, become more or less automatic habits; if we assume, moreover, that every action useful for the conservation of the species tends to leave a durable impression on the brain, and accordingly to become hereditary, the genesis of instinctive activity unfolds itself clearly and convincingly before our minds."

He then goes on to distinguish between (i) Instincts connected with defensive measures (ii) Instincts connected with anatomical structure and (iii) Instincts resulting from mental dispositions.

The brochure contains 8 plates and is full of interesting matter from cover to cover.—H.E.P.

We much regret to announce the death of Mr. J. H. Durrant, one of our panel of editors, on January 19th; an Obituary will appear in a future number, with a portrait if it can be obtained.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—Several hundred species of Coleoptera (carded) from Hants and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Duplicates.—British Lepidoptera, many species.

Desiderata.—Back volumes of Trans. Ent. Soc. Lond., and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of *christyi*, *abruptaria* v. *brunnea*, black *consonaria* and *bidentata*, *extensaria*, *curzoni*, *jasionata*, *venosata* (Shetl.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. *Herminia flavicrinalis*, *Andrens*, *Nych. dalmatina* race *andreataria*, *Warnecke*, about 30 species of rare *Acidalias*; pupae of *Eupithecia illuminata* or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

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Duplicates.—Fine bred *prunaria* *grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), *Tenthredinidae* and *Aculeates*.

Desiderata.—Species of *Dolerine* and *Nematine* sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Bred *Sparganii*, *Ochroleuca*, *Maritima*, *Straminea*, and many other Noctuae.

Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 7th and 21st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. February 23rd. March 8th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W. 2.

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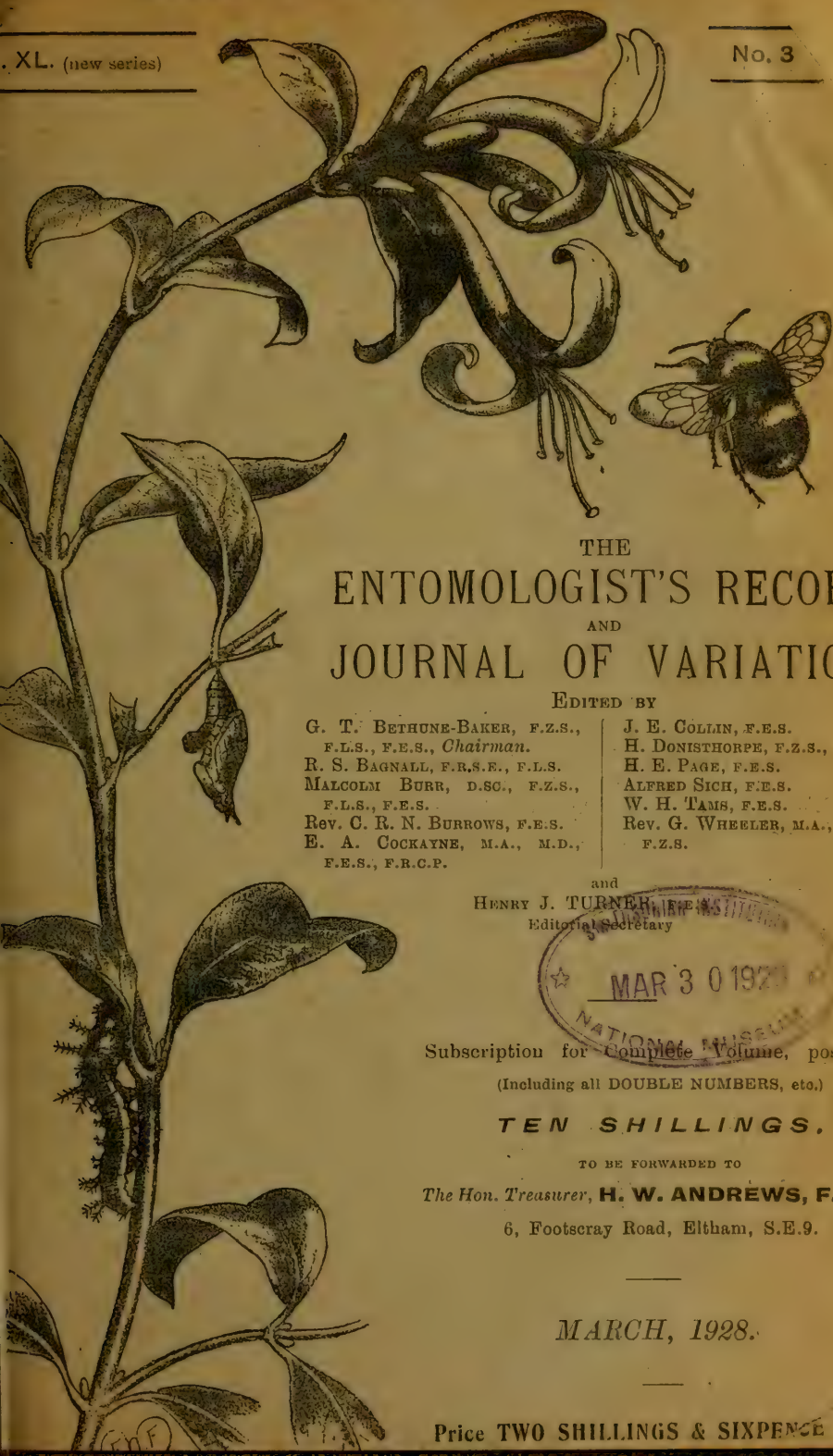
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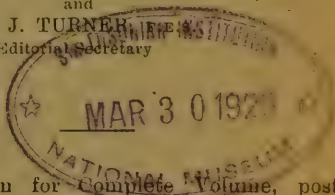
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observed at

Reservoir Aswan, 1919-1922.

By KENNETH J. HAYWARD, F.E.S.

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Fig 9



Fig 10

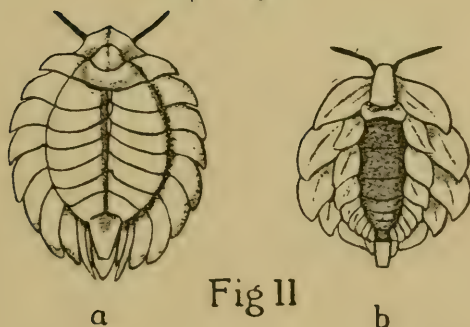


Fig 11

The Entomologist's Record.

del. E. E. Green.

FIG. 9. (a) *Kermes variegatus*, \times about 2; (b) *Kermes quercus*, $\times 2\frac{1}{2}$.

„ 10. *Phenacoccus aceris*, adult male, $\times 20$.

„ 11. (a) *Orthesia cataphracta*, $\times 12$; (b) *Ortheziola vejnovskyi*, \times about 16.



The Entomologist's Record.

JOHN HARTLEY DURRANT, F.E.S.
1863-1928.

Euchloë cardamines, L., ab. williamsii, ab. nov.

By THOMAS GREER.

Female: the costal area densely suffused with black scales, giving the appearance of a broad stripe, extending from the base to the apical blotch, and in width as far as the upper edge of the discoidal spot. The normal black scaling at the base of the wing is very considerably extended, more particularly in the inner marginal area, and reaches half way to the discoidal spot. The specimen has the yellowish suffusion and strongly marked marginal spots in the hindwings which are characteristic of race *hibernia*, Wms.

I have pleasure in dedicating this striking aberration to my friend Dr. H. B. Williams, who has made an intensive study of the life-history and variation of the species. Type, ♀; Co. Tyrone, May 26th, 1926, in the collection of Dr. H. B. Williams.

Co-types, 2 ♀♀: Lough Fea and Stewartstown, Co. Tyrone, in my own.

This aberration in its extreme form has so far occurred only in the ♀; Dr. Williams has a ♂ taken in this district in May, 1920, and I also possess a series, with a narrow stripe suffused with black scales along the basal half of the costa, widening at its junction with the orange blotch to occupy the space between the discoidal spot and the costa. The stripe however does not extend beyond the discoidal, and this aberration can only be regarded as a transitional form.

These aberrant forms, with a distinctly melanic tendency would appear to be almost confined to swamps and marshy localities.

I wish to express my indebtedness to Dr. Williams for his co-operation in identifying and describing the above aberrations.

Lycaena.

There seems to have sprung up recently some confusion and misunderstanding as to the use of the genus name *Lycaena*. At the request of my colleague Mr. Bethune-Baker and with his assistance, I have put down the facts below so that students can judge for themselves.

- 1793. Fabricius.—*Ent. Sys. emend.*, III. (1), p. 258, established the genus *Hesperia* to include all the "blues," "coppers" and "hairstreaks" known to him, in all 231 species (Rurales) and the "skippers" a further 118 species (Urbicolae); among the latter being *malvae*.
- 1798. Cuvier.—*Tabl. Elém.*, p. 592, cited *malvae* as an example (the only one) of *Hesperia*. Hence *Hesperia malvae* must stand as the type.
- 1807. Fabricius.—*Illig. Mag.*, VI. p. 285, employs *Hesperia* for 108 species of which he names ten only, all "blues" (Rurales). This has no effect as Cuvier's action as reviser is prior.
- 1807. Fabricius.—*l.c.* established the genus *Lycaena* to include 150 species of which he mentions eleven only, placing them in three groups (*mars*=*semiargus*, *echion*) (*amyntas*=*argiades*), *rubi endymion*=*meleager*, *arion*, *coridon*, *adonis*, *ledi*, *virgaureae*, *phlaeas*).

The type of *Lycaena* must be one of these species mentioned here. (If not removed previously to citation.)

1815. Oken.—*Lehrb. Naturg.* I., p. 717, restricts the genus *Lycaena* mainly to the "blues," referring to it all the species mentioned by Fabricius in 1807 except *rubi*, *virgaureae* and *phlaeas*. (He adds many others.)

The type of *Lycaena* must be one of this further restricted list *mars*, *echion*, *amyntas*, *endymion*, *arion*, *coridon*, *adonis*, *ledi*.

1816. Dalman.—"Försök. sys. Upp. Sver. Fjar.," Vet. Acad. Hand. XXXVII. 69, 90, definitely restricts the "coppers" *hippotox*, *virgaureae*, *phlaeas*, *helle* and *garbas* and *rubi*, to the genus (sub-genus) *Heodes*.

The type of *Heodes* must be one of these species. He places the "blues," which Oken had already included in his *Lycaena*, in the genus *Cyaniris*, which name cannot be maintained for any individual species of those particular Fabrician species placed by Oken in his *Lycaena*.

1824. Curtis.—*Brit. Ent.*, pl. 12, designated *phlaeas* as the type of *Lycaena*. This is impossible owing to the previous action of both Oken and Dalman.

The type of *Lycaena* must therefore be one of the remaining species mentioned by Fabricius in his list of 1807, viz., *mars*, *echion*, *amyntas*, *endymion*, *coridon*, *adonis*, *ledi*, *arion*.

Ignorant of, or ignoring, the action of both Oken and Dalman the name *Lycaena* has been employed for many groups of "coppers" and "blues," until

1838. Thon.—*Ally. Ency. Wiss.* XI., p. 139, cities *arion* only for the genus *Lycaena*.

This action settled once for all that *Lycaena arion* was the type. No doubt some of the later confusion has occurred owing to Scudder, *Hist. Sketch*, having omitted to mention the action of Thon in 1838. Barnes and Lindsay, *Ann. Ent. Soc. Am.* in 1922, omitted both Oken and Thon, making matters still worse.—Hy.J.T. [After the above was in print I bethought myself of Tutt's article in Vol. VIII., p. 306 *et sq.* of his *Nat. Hist. of British Lepidoptera* where the whole question is most fully dealt with in extenso.]

New Aberrations of, and Miscellaneous Notes on, Coccinellids.

By G. CURTIS LEMAN, F.E.S.

A. *Hippodamia variegata*, Goeze.

Herr L. Mader of Vienna in his "Evidenz der paläarktischen Coccinelliden und ihrer Aberrationen" (which is coming out in parts with plates in *Zeitschrift des Vereines der Naturbeobachter und Sammler*) figures certain aberrations, to which he has given no names and with his approval I propose to name them:

1. ab. **internepunctata**, mihi. Formula: $\frac{1}{2}$, 3. (Mader's plate 9, fig. 27.)

2. ab. **maderi**, mihi, n.ab. Formula: $\frac{1}{2}$, 1+2+3 (triangular blotch), 4, 5, 6. (plate 12, fig. 21.)

3. ab. **caprai**, mihi, n.ab. Formula: 1+2+3 (triangular blotch) + $\frac{1}{2}$ (confluent with 3), 4, 5, 6. (plate 12, fig. 23.)

4. ab. **walteri**, mihi, n.ab. Formula: $1+2+3$ (triangular blotch) $+\frac{1}{2}$ (confluent with 3), $4+5$, 6. (plate 12, fig. 25).

5. ab. **ancora**, mihi, n.ab. Formula: $1+2+3$ (triangular blotch) $+\frac{1}{2}$ (confluent with 3) $+5+4$, 6. (plate 12, fig. 26.)

I do not agree with Mader's figure 22 on plate 12 as the typical ab. *orientalis*, Ws., whose formula in his B-T. 1879 is: $1+2+3$ (dreilappige makel), $4+5$ (eine eckige Binde), with the apex touching the above "makel" (die vorn fast die makel erreicht), 6. His figure gives the "dreilappige makel" and $4+5$ with spot 5 converging towards, but not reaching, the "makel."

Mader also makes ab. *blairi*, Lem., a synonym of ab. *orientalis*, Ws., though he accepts it as a thoracic aberration, and here again I do not agree with him in his synonymy, as ab. *blairi*, Lem., has not the "dreilappige makel," but a clear confluence of $2+1+3$.

Mader on his plate 12, figs. 12 and 13, gives the name ab. *discordia*, Mader, for two distinct formulae and he agrees with me that his ab. *discordia*, will be confined to the formula: $\frac{1}{2}$, 1, 2, 3, 4, 5 (produced upwards to about the centre of spots 2 and 3 like a tadpole), 6.

I propose to name the other:

6.—ab. **subdiscordia**, mihi, n.ab. Formula $\frac{1}{2}$, $1+5$, 2, 3, 4, 6 (plate 12, fig. 13).

B. *Coccinella* hyb. *biabilis*, Marriner [Ent. Rec. XXXVIII. 6, p. 81].

Dr. Felice Capra in Boll. d. Soc. Ent. It., Anno. LVIII. N. 7, states that this hybrid is the ab. *10-pustulata*, L., of *A. 10-punctata*, L., and it will be interesting to have Mr. Marriner's views on this point. In this connection reference may be made to a most interesting paper by Mrs. O. A. Merritt-Hawkes, M.Sc., F.E.S., on "*Coccinella 10-punctata*, L.—A trimorphic Ladybird," in Ent. Mo. Mag. LXIII., p. 203.

C. *Coccinella* 7-punctata, L.

Mons. Lestage some time ago sent me, very kindly, some diagrams of aberrations of this species, which I propose to name as follows:

7.—ab. **lestagei**, mihi n.ab. Formula: $\frac{1}{2}+2+3+2+1$.

This is a very striking aberration, in which all the spots are confluent, assuming the form of a large Y. He states it was: "forme belge inédité."

8.—ab. **kirki**, mihi n.ab. Formula: the $\frac{1}{2}$ spot descends in a black line along the suture to below the level of spot 3 and this black line is linked up with $1+2$ and separately with 3. This is another similar Belgian form.

Nos. 7 and 8 appear to be distinct from, and should not be confused with ab. *confusa*, Wied. [Zool. Mag. II. I. 72 (1863)], while Weise's description in B.T. 1879 of ab. *confusa*, Wied., appears to go much beyond the original description of Wiedemann.

Della Beffa [Rev. Cocc. It. Tav. V. figs. 1 and 2 (1913)] does in fact figure my aberrations 7 and 8 under the name of ab. *confusa*, Wied., but omits to figure what I believe to be the true figure of this latter aberration, which was supplied to me by Mons. Lestage. This shows a more or less moon-shaped black blotch from $\frac{1}{2}$, with protrusions at 2, with which it is confluent, and then by a small line with 1, and at 3,

with which again it is confluent, to slightly below 3, where the arc rejoins the suture.

9. ab. **beffai**, mihi, n.ab.

Della Beffa, *l.c.* Tav. IV. fig. 84, figures this aberration under the name of ab. *turcica*, Ws., but it is at once distinguished from the typical aberration ($\frac{1}{2} + 2$) by the fact that, instead of a direct confluence, the $\frac{1}{2}$ spot is continued along the suture to a point opposite 2, with which it is then confluent at right angles. Mons. Lestage writing to me in 1924 was of opinion this was a new aberration.

D. *Anatis ocellata*, L.

Weise (*B.T.* 1879) describes his v. *subfasciata*, as:—

“Normal farbung.”

“♀. Makel 8+9 quer verbunden . . . v. *subfasciata*” and its formula is definitely: 1, 2, 3, 4, 5, 6, 7, 8+9, 10.

In *B.T.* (1885), however, he engrafts on this another formula with 3+4+5, but this is not correct and I propose therefore to name this:

10.—ab. **ida**, mihi. 1, 2, 3+4+5, 6, 7, 8, 9, 10.

E. *Harmonia 4-punctata*, Pontopp.

(a) Della Beffa (*Rev. Cocc. It.* 172) in 1913 under var. *multimacula* (wrongly spelt *multimaculata*), Heyd., diverges from the latter's description with 6 spots (1, 2, 4, 5, 7, 8) in *Ent. Nach.* 4, 53 (1883) to include specimens with 8—10, 12 (*i.e.*, on both elytra) spots:—

“Elitre con 8-10, 12 punti, 4-5, 6 per elitra. Esistono i punti 1, 2, 3, 4, 5 (Tav. VI., fig. 22); ovvero 1, 2, 4, 5, 7 (Tav. VI. fig. 23); ovvero 1, 2, 3, 4, 5, 7 (Tav. VI., fig. 24); ovvero 1, 2, 4, 5, 7, 8 (Tav. VI. fig. 25).”

It is obvious that only the last mentioned formula is the ab. *multimacula*, Heyd., and the others require new names:

11.—ab. **beffai**, mihi: 1, 2, 3, 4, 5.

12.—ab. **maderi**, mihi: 1, 2, 4, 5, 7.

13.—ab. **weisei**, mihi: 1, 2, 3, 4, 5, 7.

(b) Mader in *Entom. Anzeiger* VI., Nr. 11 (1926) proposes the following two new aberrations:

1. Jede Fid. mit 4 schwarzen P. gleichgültig.

Welchen a *pudica*, nov. ab.

2. Jede Fid. mit 5 schwarzen P. gleichgültig.

Welchen a *incontenta*, nov. ab.

As he does not define their respective formulae I do not think these names can stand and in any event they clash with the ab. *multimaculata* of Della Beffa.

(c) Weise (*B.T.* 1879) describes his v. *pinastri* as having 14 spots, No. 6 being absent, so that his formula is definitely; 1, 2, 3, 4, 5, 7, 8.

Della Beffa (*l.c.* 1913) under v. *pinastri*, adds: “talora l'8,” but this cannot be Weise's aberration and I propose to name it:

14.—ab. **donisthorpei**, mihi: 1, 2, 3, 4, 5, 6, 7. It may be noted that Weise (*B.T.* 1885) does not quote spot 6 as missing.

F. *Coccinella alpina*, Villa.

Dr. F. Capra (*Ann. d. Mus. Civ. di Storia Nat. di Genova*, Vol. I. II. 30 Oct. 1926) has made a new genus for this species:

"*Adaliopsis*, nov. gen.

"Type of genus—*Coccinella alpina*, Villa. *Suppl. Col. Eur. Dupl.* 1835, p. 50, n. 70 (*Adalia alpina*, auct.).

G. *Rhizobius litura*, F., var. *maura*, O'Mahony.

This black variety, found by Mr. O'Mahony on the east end of North Bull, Co. Dublin, has now been named by him [*Ent. Mo. Mag.* LXIII. 208 (1927)], but it will probably be found in many collections as Sir T. Hudson Beare took it in August, 1925, from Wicken Fen [*id.* 233] and I find Mr. H. St. J. K. Donisthorpe took other specimens at Mildenhall and Barton Mills (1922) and Burwell Fen (1924).

H. After some years of search I have at last succeeded in purchasing a copy of Weise's *B.T.* II. Heft. *Coccinellidae*, published at Mödling in 1885, pp. 82, a very nice clean copy bound in boards.

Euxoa tritici, L., and the ab. pseudogothica, Curtis.

By W. PARKINSON CURTIS, F.E.S.

I have read Mr. Wightman's note Vol. XXXIX, p. 169. In my view, Tutt's *subgothica* is a conception founded on a concrete object, but a different conception to, and founded on, a different concrete object from Haworth's *subgothica*.

If Mr. Wightman will read the table on page 46, as well as the letterpress on page 51, he will see that Tutt has defined what he understands by *subgothica*, videlicet:—a *tritici* with the following coloration "ground pale greyish fuscous; with a pale costa; with a dark space between the stigmata and no cuneiform marks," and inferentially with no distinct transverse marking and he adds " = subvar. *subgothica*, Haw."

Peltia subgothica does not comply with Tutt's diagnosis. It fails on the tabular diagnosis at the first step because it is not a *tritici*. I should hesitate at the "ground pale greyish fuscous," I have only seen some 50 *Peltia subgothica* but they do not appeal to my eye as "pale greyish fuscous."

On page 51, Tutt says "A great deal of error has arisen in connection with this subvariety of Haworth's. In America it has been used as the name of a closely allied species." Later he says "The *subgothica*, Haw., refers to some British species."

Now what possible inferences can be drawn from such language? Obviously only the following:—

Tutt had in his mind a conception of a colour variation of *tritici*, complying with his above quoted diagnosis, but not the real *subgothica*.

Tutt believed that Haworth had in his mind a conception of an endemic British insect falling in Tutt's view within his above quoted diagnosis and being in fact a form of *tritici*. That the American authors were in error in applying to an extra-British and intra-American species a name, which Haworth had, in Tutt's view, applied to *tritici*.

That such inferences are sound receives confirmation from a perusal of pp. 43, 44, 45, where Tutt says that he believes Guenée's *gypaetina*

is also a variety of *tritici*. *Gypaetina*, Gn., is, as a matter of fact, a *Porosagrotis*, and no more an *Euxoa* than *subgothica* is.

Tutt obviously was not familiar with the American *Agrotinae*.

Haworth did have the American species before him when he drew up his diagnosis.

The fact therefore emerges that Haworth meant one thing and Tutt another.

We know what Haworth meant. We have the concrete object upon which his conception was founded.

The concrete objects on which Tutt founded his conception may be available, I know not—if I remember rightly Tutt's collection was dispersed and he had not selected particular specimens as types, so once the series of objects on which his conception was based was separated from its cabinet label one only had his words to rely on, and his words do not cover *subgothica*, Haw. Tutt himself says so and he should know; he states they do not cover *janulifera*, Gn., which is the same thing as *subgothica*, Haw. I may be entirely wrong in my conception of the utility of names and the use of the Code; but I was brought up to believe that a name was a word attached to an object to distinguish it from other objects. The same name applied to two dissimilar objects hardly seems to achieve the end of distinction.

The Code lays down that where the same name is applied to two dissimilar objects it may only be used for one, and that the first named.

I may be wrong in this, but as I understand the Code, you cannot suppress Tutt's name already published. It will stand as Tutt's label for Tutt's conception. It is not convenient nor practicable in discussing *tritici* to use a rigmarole like "I am referring to the form called *subgothica* by Tutt, which you must not confuse with the distinct species, *Feltia subgothica*, Haworth," on every occasion; therefore the Code permits a new name to be substituted for Tutt's conception to avoid the rigmarole.

[Tutt's *A. tritici* were bought at a sale by Alderson, I thought at the time it was on behalf of Mr. H. E. Page, but Mr. Page has no recollection of the transaction, nor has he the specimens in his collection. It was not Tutt's habit to label his insects, but at the bottom of sets he would put one locality label. Series of the Noctuae, so far as they went, would, perhaps, be labelled similarly with aberrational names. His work *British Noctuae* does not represent his own collection, but was a collection of all the information he could obtain from all over the world on species found in Britain. Hence he would have descriptions of which he had never seen the original specimens. Tutt may not have seen Haworth's *subgothica* as, I am told, it did not come to the B.M. until the dispersion of Mason's collection. He uses Humphrey and Westwood's description of *subgothica* (*Brit. Moths*), but ignores the figure, possibly from its imperfection. (In my copy it may represent anything).

I, personally, do not think that Tutt ever had a *subgothica* in his collection, i.e., a specimen agreeing with Haworth's type. No doubt collectors have at all periods since Haworth tried to fit specimens of *tritici* to the various aberrational names with more or less success. Hence probably we have in collections examples labelled *subgothica*.

It would seem to me that it is a plain case of non-existence of an insect which should be the concrete of the name *subgothica*, which name, in my opinion, must henceforth be dropped.—Hy.J.T.]

Additional Records of Lepidoptera from the Witley District of Surrey.

By W. HAWKER-SMITH, F.E.S.

The following List is supplementary to the "Further Records of Lepidoptera from the Witley district of Surrey," *Ent. Record*, XXXVI., pp. 75-78 (1924). It will save repetition to state here that all the following were taken at light at The Hill, Wormley, Surrey.

SPHINGIDAE.—*Smerinthus ocellatus*, L. Two in June, 1924.

NOTODONTIDAE.—*Cerura furcula*, L., one taken 5.ix.1924. *Pheosia tremula*, Cl., several in June, July and August, 1924; two in July, 1927.

NOLINAE.—*Nola confusalis*, H.-S., one 26.v.1924; one 3.vi.1927.

LITHOSIINAE.—*Comacla senex*, Hb., five taken 10.vii.1924. *Endrosia irrorella*, L., one 10.vii.1924.

NOCTUIDAE.—*Noctua baja*, Fab., erroneously recorded as *N. castanea*, Esp., in List *Ent. Rec.*, XXXII., p. 89 (1920). *Noctua ditrapezium*, Bkh., taken sparingly in June, July and August, 1924; two in July, 1927. *Triphaena interjecta*, Hb., one 5.viii.1925. *Mamestra contigua*, Vill., one 23.vi.1924. *Dianthoecia capsicola*, Hb., sparingly June to September, 1924; one 6.viii.1925; one 3.ix.1927. *Xylophasia sublustris*, Esper, one 24.vi.1924. *Synia musculosa*, Hb., one 23.vii.1925. *Calamia lutosa*, Hb., one 2.x.1925. *Caradrina alsines*, Brahm, rather common in June, July and early August. *C. quadripunctata*, F., one in July, 1924; one 25.vi.1926. *Omphaloscelis lunosa*, Haw., three 19.ix.1924. *Amathes helvola*, L., not uncommon in September and October. *A. lychnidis*, Hb., not uncommon in September and October.

GEOMETRIDAE.—*Oporabia christyi*, Prout, four in October, 1924. *Eupithecia goossensiata*, Mab., one July, 1924; one 5.viii.1925; one 7.viii.1927. *E. succenturiata*, L., three in July, 1927. *Collix sparsata*, Hb., one 24.vi.1924. *Abraxas grossulariata*, L., this species was curiously omitted in the lists of 1920 and 1924 but from the series in the Hill Museum it is apparently as common as in most localities. *Ennomos fuscantaria*, Haw., seventeen taken during August, September and October, 1924-1927. *Selenia tetralunaria*, Hufn., one 2.v.1925.

HEPIALIDAE.—*Hepialus fusconebulosa*, De Geer, one 3.vi.1927.

Three Species of Coleoptera new to Britain.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

1. **Euplectus nitidus**, Fairmaire, *Ann. Soc. Ent. France* (S.3), 5, 136 (1857). "Elongatus, depressus, rufulus, nitidus, pubescens, capite prothoraceque parce punctatis, capito subtrigono, foveis duabus profundis antice conjunctis, fere parallelis, postice foveola profunda terminatis; occipite haud foveolato; prothorace cordato, capite longiore, vix latiore, ante basim trifoveolato, foveolis sat magnis,

sulco transverso conjunctis; in disco antico foveola oblonga; abdomine obscuriore."

This species comes in the subgenus *Plectophloeus*, Reitter, in which the abdomen is without any distinct depressed area at the base of the first two visible dorsal segments, etc. It is closely allied to *E. nubigena*, Reitt., but on comparing it with that species (which I had previously taken in Windsor Forest), I found it did not agree. The head is broader in proportion to the length, the frontal furrows are broader in front, and the dorsal striae of elytra are shorter, etc.

I captured this little beetle in Windsor Forest on May 3rd, 1927, by sifting frass from a very old decayed oak stump. Mons. C. Brisout de Barneville took it in France, at Marley, in rotten wood of old chestnut trees.

2. **Gnathoncus buyssoni**, Auzat, *Bull. Soc. Ent. France*, 1917, 184, 206, 208. "Ovalis, convexus, niger, nitidus; antennis pedibusque ferrugineis; fronte punctulata, stria nulla. Pronoto lateribus dense, etc. fortiter, disco minus fortiter et dense punctato; stria marginali interrupta. Elytris postice et lateribus dense, anterieus tenuis et parum punctatis; striis dorsalibus validis, 1 subintegra 2-4 fere in medio abbreviatis, quinte appendice basali, suturali medium attingente; humerali parallela, subhumerali externa basali, interna lata disjuncta, margine inflecto trisulcato. Propygidio pygidioque dense punctatis et tenuiter rugosis. Prosterno plano, punctulato, antice abrupte constricto, striis convergentibus; mesosterno marginato, dense punctato, tibiis anticis septemdenticulatis, posticis spinosis.—Long. 2.5mm.; lat. 1.8mm."

This is a very distinct species, and superficially looks much more like a *Saprinus* than a *Gnathoncus*. The punctuation is stronger and closer than in the other species, and the whole upper surface is not so shining. There is a very good figure published with the description.

It is found in France in old trees in which Owls, Hawks, and the Wryneck, etc., have made their nests. Du Buysson captured it at Broût-Vernet, Central France.

I took this Histerid in Windsor Forest on July 5th, 1927, in a hawk's nest, which had been built at the top of a tall Scots' Pine. The nest consisted of very coarse sticks, twigs and moss, and besides the young dead hawks, it contained the bodies of several other birds which had been brought to them as prey by their parents. The latter, alas! had been shot. Other beetles present in the nest were:—

Atheta nidicola, Johan., scarce (new to Britain), *A. nigricornis*, Th., abundant, *A. reperta*, Shp., *A. boletobia*, Th., *A. cinnamoptera*, Th., *A. laticollis*, Steph.; *L. laevana*, Mul.; *Philonthus proximus*, Kr.; *Oxytellus tetracarinatus*, Block., abundant; *Choleva fumata*, Spence., abundant; *Omosita discoidea*, F., and *Atomaria apicalis*, Er., abundant.

I, personally, recognise three other species of *Gnathoncus* as British, as does also Mr. Collins of Oxford, who has specimens of each exactly matching my sets. These are *G. nannetensis*, Mars., *G. punctulatus*, Th., and *G. nidicola*, Joy. Of these three species *G. nannetensis* is a little the largest. According to Reitter it is a synonym of *G. rotundatus*, Kugelann, and differs from *G. punctulatus* (which is the smallest) in the punctuation of the pygidium, etc. *G. nidicola* another bird's

nest species, is larger than *punctulatus* and differs, according to Joy in the shape and size of the teeth on the tibiae, etc.

3. *Atheta nidicola*, F. P. Johansen. Danmarks Rovbiller 159 (1914). I captured a short series of this Staphylinid in the hawk's nest mentioned above, and as it was a very distinct looking species in the field, I put them into a tube by themselves, separate from the numbers of other species of *Athetæ* taken.

Mr. Keys having told me it was a species quite unknown to him, I sent specimens on to Colonel Sainte Claire Deville, who wrote—"Your little *Atheta* from the hawk's nest is highly interesting. I have easily and surely identified it with the almost unknown *A. nidicola*, J. P. Johansen, 1914, which is said to live 'i traear i storre fuglereder' [in trees in the nests of large birds]. I possess it from Örebro, where my correspondent A. Jansson took it in a squirrel's nest. Endly it was taken very recently in the vicinity of Nancy 'dans un nid de falconides,' amongst innumerable *nigricornis*, by my friend and colleague Bossong."

I have been waiting to see the description of this insect, but there is not a copy of the book on the Rove beetles of Denmark, in which it occurs, in this country at present, although it has been ordered by the British Museum. As, however, I understand it is all in Danish—even the description—I thought it best to publish this record now. It is a small shining species, about the size of *A. fungi*, black with brown elytra and legs, and, as I before remarked, distinct looking in the field.

An Essay on the Origins of the Geographical Variations of the Rhopalocera in Europe exemplified by *Melitæa aurinia*, Rott.

By ROGER VERITY, M.D.

The following considerations have evolved from a careful study, I have had to make, of the Alpine forms of this species to place correctly the specimens I had collected in the Cottian Alps. It has seemed worth while exposing them in detail, and whilst I was at this task I happened to receive from Prof. J. W. H. Harrison, of the Armstrong College of Newcastle, his inspiring series of papers on "The Geographical Distribution of the moths of the Subfamily *Bistoninae*" (*Naturalist*, 1916 to 1918). I found that his inferences and his conclusions in connection with that distant group of the Lepidoptera coincided in the most remarkable way, sometimes down to incredible details, with the inferences I had drawn from this *Melitæa*. This proof, that our work could not be the result of too fertile an imagination, encouraged me very much to carry it on. Useful suggestions from those papers were made use of here, so that, altogether, I have now been able to work out the subject much more minutely and exactly than I had done in 1925, when dealing with the genus *Zygæna* and utterly ignorant that Harrison had preceded me in these first attempts at a subject, which promises to yield far reaching results, when the evidence of all the species is brought to bear on the general conclusions, after carefully weeding out by comparison the inevitable initial mistakes. It can already be perceived that some of the variations one might have considered simple races, due to the immediate effects of different

environments at the present day on individual development, are, on the contrary, of extremely ancient origin and are due to hereditary factors developed by division and isolation during countless ages. My conception of "exerge" is greatly enforced as applying to groups of local races, which have a more or less demonstrable line of descent in common. What is more, these lines appear in Europe to be very few and to be very much the same in the most different sorts of Lepidoptera. I have thus dwelt rather at length on the remarks about *aurinia*, because they furnish a good base from which to start the fascinating comparative work we have before us, but the Tyrrhenian zone has had to be dealt with separately, as this species has little connection with it. Another important result, which ensues from these researches is that they furnish a clue to rational classifications of races and even of species, and that they suggest analogies and divergencies that one would scarcely have suspected by purely morphological data: the case we will consider of the British *aurinia*, which probably descends from the same source as the Alpine exerge, usually known hitherto as *merope*, rather than from that of nymotypical *aurinia* of Central Europe, is a good example. The first question I started to elucidate was, as mentioned above, precisely the one in connection with the proper use of the name of *merope*, De Prun. Bearing in mind that De Prunner quaintly begins by describing the hindwings, which he calls *priores* or *primores*, then the forewings which he calls *postici*, and that he designates the upperside as *extus* and the underside as *intus*, his original description translates literally as follows: "Wings above with transverse fuscous-ochraceous bands; hindwings with five black dots: below pale-yellow with five black dots. Round *Lysiol* in the Varaita Valley" (*Lep. Ped.* p. 73.) This locality is thus on the southern side of Mt. Viso, near the southern boundary of the Cottian Alps. Ochsenheimer, in 1816, placed this insect correctly as a variety of *artemis* and gave a good description of the Piedmontese race from specimens in the Radda collection in Vienna. Unfortunately Treitschke, in 1834, took it up in his supplement and applied the name of *merope* to the Swiss and Tyrolese high-mountain insect, with a description drawn from the latter, which he considered a distinct species. Thus the evil began and the name, during a whole century, has been used with this meaning. It is time this mistake should be put a stop to, as there are two reasons, which make it impossible to use it in this sense. The first is that the insect known by this name does not exist in the Cottian and in the Maritime Alps and the second is that De Prunner's diagnosis does not suit it, whereas it applies much better to the race of these Alps than might be thought by those that are not acquainted with it; this is the case nearly universally, because there scarcely exist in collections specimens from the Piedmontese watershed. Even Turati described (*Entomologische Zeitschr.*, 1910, p. 223), his *comacina*, from Brunate, above Como, as remarkably new in features, whereas it stands very close to De Prunner's, and a comparison with it is required to establish whether they are distinct. Oberthür had specimens from the French watershed, notably those he had collected at Larche, in the Basses Alpes, and he had been struck by the remarkable difference between them and those he had found at the Ryffelalp in Switzerland, on account of their "reddish aspect" instead of "the pale chamois

yellow" (*Ét. Lép. Comp.*, III, p. 226). These words convey the difference between the general aspect of the two races, which is visible at first sight: De Prunner's *merope* has on upperside a uniform warm ochreous ground-colour of a dull, dingy hue, as exactly expressed by its author's term of "fuscous"; the dark pattern is not much thicker than in the average nymotypical *aurinia* and gives the impression of an even network, but the black suffusion at the base is very dark and it has considerable extent; the most peculiar feature is, however, afforded by the entirely colourless underside; the shiny chitin is quite uniformly tinted with pale ochre-yellow and, through it, one dimly sees the upperside pattern; in some individuals there only exist five minute black dots on the hindwing, precisely as described by De Prunner, but usually there also are a greater or lesser number of the capillary black streaks by which variegated bands are edged in other races; what strikes one particularly is that the space between the two central rows is not lighter, but of the same tone of yellow as the rest of the ground-colour. It will be seen that the original description is quite correct and subsequent writers have no excuse, except their own unacquaintance with the race, for having disregarded it and applied the name of *merope* to a totally different one, so that the latter, which has been handled by hundreds of entomologists, has actually remained unnamed to this day. I suggest calling it **glaciegenita**, selecting as cotypes specimens from the Stelvio Pass; others I have from Albula, in the Engadine, are identical with them. They differ from *merope* by their still smaller size, by their very elongated wings with sharper apexes, by often being still poorer in scaling on both surfaces and especially in the female sex (the extreme individual form in this respect I should name **translucens**), by the considerably greater extent of the dark transverse bands and of the nervular streaks, which break up the ground-colour into rows of round spots, by the contrast between those of the latter, which are of a yellowish white, and those which are of a dull red tone; on the underside, except in the individuals tending to the *translucens* form, in which the wings may be nearly entirely denuded, the same variegated colouring constitutes a striking contrast with that of *merope*; the general tone is white, with a touch of greenish-yellow, very much colder than the ochre-yellow of *merope*; the lighter parts are however very much reduced by the upperside dark markings, showing through as pale gray, and the red portions of this surface are represented to a very variable extent by a light scaling of a soft milky red, which do not exist in *merope*, whilst their capillary black edges, so sharply defined in nymotypical *aurinia*, are instead, on an average, even more effaced than in *merope*. What greatly increases the importance of the distinction between *merope* and *glaciegenita* is that there are reasons, which have made some entomologists incline to consider it a distinct species from *aurinia*, namely, amongst modern writers, Wheeler and Stichel. The larvae are different and feed on different plants; the shape of the wings, their flight and their behaviour differ; there is a gap between their habitats from 4000 ft., where *aurinia* ends, to 5500, where *glaciegenita* begins, according to Wheeler; this author also states there never occur transitions from one to the other; this is very probably quite true as a general rule, but its importance is diminished by the occurrence of exceptions such as the pretty form I possess, collected by Wülschlegel of Martigny, probably

PERIODS.	CLIMATE.	RISE OF MOUNTAIN CHAINS	ANTER. AS. AND EUROPE JOIN TO ASIA.	TYRRHENIAN LANDS.	IBERIC Isthmus.
Recent :					
Pleistocene :	3 or 4 glaciations		North of Aralo-Caspian Sea	{ Rise of land-mass of Peninsular Italy. Break up of Greece-Sicily-Malta-Tunis isthmus	cut by Gibraltar strait
Pliocene :	{ Upper tropical Middle temperate Lower very temp.	Caucasus		{ Sardinia cut off south Continuous isthmus joins Africa to Sardinia and Corsica (to Piedm.?)	{ continuous (Riff-Atlas strait closes North Baetic strait closes Channel cuts off Riff from Atlas
Miocene :	{ Upper very temp. Middle temperate Lower tropical	{ Himalayas Swiss Alps and Carpathians	at the Himalayan region	{ Apennines connected to Alps of Piedm. as a narrow promontory Corsica and Sardinia isolated and rising of Apennines as an island	{ Andalusia connected to Africa, but separated from Central Spain by North Baetic Channel.
Oligocene :	{ Upper tropical Lower tropical	{ Pyrenees Riff Mts. Baetic Chain	South of Aralo-Caspian Sea		
Eocene :	{ Upper tropical Lower very temp.				
Cretaceous	Tropical	Eastern Alps		Corsica and Sardinia joined to Elba and to Dinaric Alps	

in the mountains above it. I can only describe it by saying that, in every respect, it is on both surfaces exactly intermediate between the nymotypical *aurinia* and *glaciegenita*: size, shape of wings, amount of scaling, brightness of colour, extent of black pattern; I need only mention that the underside is as discoloured as in *glaciegenita*, the black and the red only dimly showing through and with no red scales, so that it has a very cold look, but, on the other hand, with the capillary black streaks developed to their full extent, as in *aurinia*; I consider it worth recording as **frigescens**. All considered, I think one can safely come to the conclusion that the relationship between *glaciegenita* and *aurinia* is of the kind I have proposed calling "exerge"; they stand to each other as, for instance, *gardetta* = *satyrion* stands to *Coenonympha arcania*, the former having a constitution modified permanently in a hereditary way so as to stand the very special conditions of surroundings, which are buried under ice and snow during nine or ten months of the year. This exerge of *aurinia*, as a whole, will have to be named from the race belonging to it which was first described and this seems to be *asiatica*, Stdgr., of the Ala Tau.

To determine the position and the relationship of this and the other exerges of *M. aurinia*, I must make an attempt to trace back their origins in past epochs. The following table of climatic and geologic sequences will, I think, be of considerable assistance to the readers who are not acquainted with these subjects and it is well to bear in mind that, from the end of the Cretaceous to our times, at least three millions of years must have elapsed.

(To be continued.)

NOTES ON COLLECTING, etc.

BREPHOS PARTHENIAS AB. FLAVA, WOOD.—I cannot help feeling that the editor would have done better service to science if he had written to his correspondent and ascertained whether the fore-wings of ab. *luteata* have the reddish tint of the type or whether they are the pure grey colour so characteristic of *flava*, instead of misrepresenting my meaning. If they are pure grey, *luteata* is the same as *flava*, but if they are reddish *luteata* is a different form.—E. A. COCKAYNE, A.M., D.M., F.E.S.

CORRECTION RELATIVE TO THE BLUE CORIDON-FORM OF SPAIN.—In one or two articles or papers I have written lately and in correspondence, I have stated that I consider *lilacina*, Chapman-Tutt, was identical with *caelestissima*, Verity-Querci, basing this upon my series which had a label bearing the former name at the end of a short set, and the comparison with it of a series collected by the Querci family. I have now acquired the one specimen, labelled on the pin with Dr. Chapman's writing, *lilacina*. It is quite different in colour from any other ♂ in my series of over 30 of the beautiful blue form. Both by daylight and by artificial light, the difference is strongly apparent.—Hx.J.T.

CURRENT NOTES AND SHORT NOTICES.

Our worthy Treasurer, Mr. H. W. Andrews, wishes it to be mentioned that almost all the subscribers have already remitted their annual subscription, and he hopes that the small remainder will quickly respond to the notice on the front cover.

When the present Supplement on British Coccidae is completed we shall publish a further contribution to the Fauna of Hampshire, "A List of the Hemiptera-Heteroptera of Hants," by Mr. H. P. Jones, of the Natural History Museum, Wollaton Hall, Nottingham. We understand it "will be something quite special as I am fitting in some recognised characters for every species, as well as describing the families, genera, etc. The nomenclature is well up to date, and this, combined with the keys for distinguishing the species (including all new) should result in some demand for the paper." It may possibly commence in the May number.

Heft 4 of *Iris* for 1927, contains a very useful article on Corsica by Dr. Schawerda, who spent several weeks there in the spring of 1925, and the four weeks of July in 1926. He gives information on the neighbourhoods of Bastia, of Orezza, of Cap Corse, of Corte, of Evisa, of Ajaccio, of Zonza, of Bonefacio, of Monte Renoso, etc., besides various day excursions to particular grounds like Vizzavona. He describes several new forms including an aberration *caeca* of *Satyrus neomiris*, which was rarely found. A list of species and forms not hitherto recorded from the island is added. There is no Bibliography, which would have been very useful, but a reference is given to the *Verhandl. zool.-bot.* of Vienna, Vol. LXXVI., 1927, p. 25, where a considerable list of papers on Corsica was published, mostly from continental sources and far from complete, all French literature and most English references being omitted.

No. 1 of Vol. II. of the *Bulletin of the Hill Museum* is published and we understand that the succeeding numbers will appear quarterly. The subscription will be the same as for the preceeding volume. As a separate publication the Hill Museum proposes to publish a Monograph of the Pierine genus *Delias* to be issued in parts at intervals. The Hill Museum is particularly rich in species of this genus from New Guinea and the islands surrounding, most of which have been described and introduced since the publication of the Pierine portion of Seitz.

Volume IX. of Seitz., *Macrolepidoptera of the World, Indo-Australian Rhopalocera* is now complete and the last parts, English edition, will be issued directly. We understand that Messrs. Watkins and Doncaster, 36, Strand, are the English agents.

The following Members of the South London Entomological Society were elected Officers and Council of the Society at the Annual Meeting on January 26th, 1928. *President*:—E. A. Cockayne, D.M., A.M., F.E.S. *Vice-Presidents*:—H. W. Andrews, F.E.S., T. H. L. Grosvenor, F.E.S. *Treasurer*:—A. E. Tonge, F.E.S. *Librarian*:—E. E. Syms, F.E.S. *Curator*:—S. R. Ashby, F.E.S. *Hon. Editor of Proceedings*:—H. J. Turner, F.E.S. *Hon. Secretaries*:—Stanley Edwards, F.L.S., etc. (*Corresponding*), H. J. Turner, F.E.S. *Hon. Lanternist*:—J. H. Adkin. *Council*:—J. H.

Adkin, F. B. Carr, A. W. Dods, A. de B. Goodman, F.E.S., O. R. Goodman, F.Z.S., F.E.S., C. N. Hawkins, F.E.S., W. Rait-Smith, F.Z.S., C. Sperring, W. H. T. Tams, F.E.S.

 **BITUARY.**

John Hartley Durrant, F.E.S.

Eighteen years have gone by since the passing of our revered late editor, J. W. Tutt, in January, 1911, and until now only once since has our panel of editors been broken by the death of a colleague, the great Doctor Chapman in January, 1922. Now we have to deplore the loss of the erudite John Hartley Durrant, whose knowledge of the literature of entomology was both extensive and deep, and the loss of one so generally known in entomological circles will be felt both far and wide. Mr. Durrant was born in January, 1863, and thus had just reached his 65th year, when a fell disease brought his end on Thursday, January 19th. From 1886 he had charge of the great collection of Micro-lepidoptera got together by the late Lord Walsingham and did a great deal to aid in making the Library at Merton Hall second to none. When these collections and library came, in 1910, to the Natural History Museum, the proviso of the gift was that Durrant should remain in charge as long as he lived, since he was past the entrance age of those joining the permanent staff of the Museum. From that time till the present every visitant lepidopterist found his way to "Durrant's room" and his opinion was sought on all and every question relating to the "micros" which he knew so well, and all points of nomenclature, that thorny trouble, were always discussed with him. Accustomed to take copious and careful notes on every subject and detail which arose, accompanied by a skill in drawing and colouring his sketches, unusual in many of us, he had abundance of references close at hand to strengthen his opinions and arguments.

Perhaps one of the pieces of work most valuable to the nation as a whole, was in collaboration with Major-General Sir W. W. O. Beveridge, in the "Army Biscuit Enquiry." A Report was published in 1913 and in consequence of the value of the results obtained its recommendations were carried into practice during the war. It has been asserted, on good authority, that the improved methods of preparing and baking army biscuits adopted as the result of these researches, have resulted in the saving of a considerable sum annually.

In the two great works "*Fauna Hawaiiensis*" and "*Biologia Centrali Americana*" he was personally responsible for much of the work in the section for Micro-Lepidoptera and the extensive synonymy given in the latter impresses one with the evidence of most painstaking care and sound judgment. His own interleaved copies of many works filled with copious notes and sketches will be a fund of information and a great help to all future workers in the Museum.

With Lord Walsingham he was responsible for the compilation of a series of nomenclatorial regulations known familiarly as the "Merton Rules." Knowing the need of some definite guide-lines in nomenclature, and knowing what incongruous work had been done in the past, the authors of these rules displayed a sympathetic appreciation of the

needs of the systematist and an attempt to avoid the pitfalls which so many previous workers had experienced, and unify the future nomenclature of the science.

Until his health broke down his work for this magazine was most helpful in detail, and his intensive knowledge of literature and nomenclature was always at the service of his fellow editors.

Well known to all who visited the Entomological Department of the British Museum, he was an equally familiar figure at the Meetings of the Entomological Society, which he joined in 1883, until failing health kept him from venturing out at night. No doubt his apparently strong constitution suffered from his strenuous work during the war in the British Red Cross Society added to the effect of the loss of his only child during that period.

We shall miss his genial welcome in the Museum, we shall miss his advice in all entomological questions; there will be one less to rely on for opinions based on multitudinous facts; he will long be remembered by all who knew him.—Hy.J.T.

Gervase Frederick Mathew, F.L.S., F.E.S.

Another of the oldest Fellows of the Entomological Society has just passed away in the death of Gervase F. Mathew, who was elected as far back as 1865. Entomologists will remember him as the discoverer of *Leucania favigolor*, and in his honour Tutt named a new species of *Coenonympha*, *C. mathewi*, taken by Dr. Chapman in some numbers in the N.W. of the Iberian Peninsula. He was born in 1841 and died on the eve of his 86th birthday. Until about two years ago (about when we received a long letter from him) he was a keen naturalist and entomologist and was a contributor to our magazines, when his duties in the navy did not stand in the way. For more than 40 years from 1861 he was in the service and retired with the rank of Paymaster-in-Chief. One of his early appointments was to the "Warrior," the first British ironclad; he had visited all parts of the world and his journals, which he kept continuously from 1861 to the commencement of his illness in 1925, are full of records, not only of his professional experiences, but also of the scientific observations which he made in many countries. He was also a Fellow of the Zoological and Linnean Societies.—Hy.J.T.

J. C. Moberley, M.A.

Readers of the early volumes of the *Ent. Record* will recall the name of J. C. Moberley as that of a regular correspondent and an ardent naturalist. He was born in 1848, the son of the then Bishop of Salisbury. The Rev. C. R. N. Burrows writes that he was a regular correspondent with him until about 1900 when his various duties and responsibilities compelled him to give up the study at which he had worked with such zest. A solicitor, he was appointed official receiver in bankruptcy. For many years a member of the Winchester Diocesan Council, he was associated with numerous religious charitable funds, and at one time a governor and chairman of St. Cross, Winchester. In early life he played cricket for Hampshire. He resigned his Fellowship of the Entomological Society some years ago. Recently he had joined the Hampshire Entomological Society.—Hy.J.T.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—Several hundred species of Coleoptera (carded) from Hants and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Duplicates.—British Lepidoptera, many species.

Desiderata.—Back volumes of Trans. Ent. Soc. Lond., and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of *christyi*, *abruptaria* v. *brunnea*, black *consonaria* and *bidentata*, *extensaria*, *curzoni*, *jasionata*, *venosata* (Shetl.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. *Herminia flavicrinis*, *Andreas*, *Nych. dalmatina* race *andreasaria*, Warnecke, about 30 species of rare *Acidalias*; pupae of *Eupithecia illuminata* or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

Duplicates.—*P. apollo nevadensis* and rare Palearctic Rhopalocera, also African *Danaïdæ*, *Charaxes* and *Hypolimnas*.

Desiderata.—Many rarer and few common species Rhopalocera. European only.—W. G. Pether, 4, Willowbridge Road, London, N.1.

Duplicates.—Fine bred *prunaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.

Duplicates.—Bred *Sparganii*, *Ochroleuca*, *Maritima*, *Straminea*, and many other Noctuae.

Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 21st. April 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. March 22nd, April 12th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to H. J. TURNER, "Latemar," West Drive, Cheam.

We must earnestly request our correspondents not to send us communications IDENTICAL with those they are sending to other magazines.

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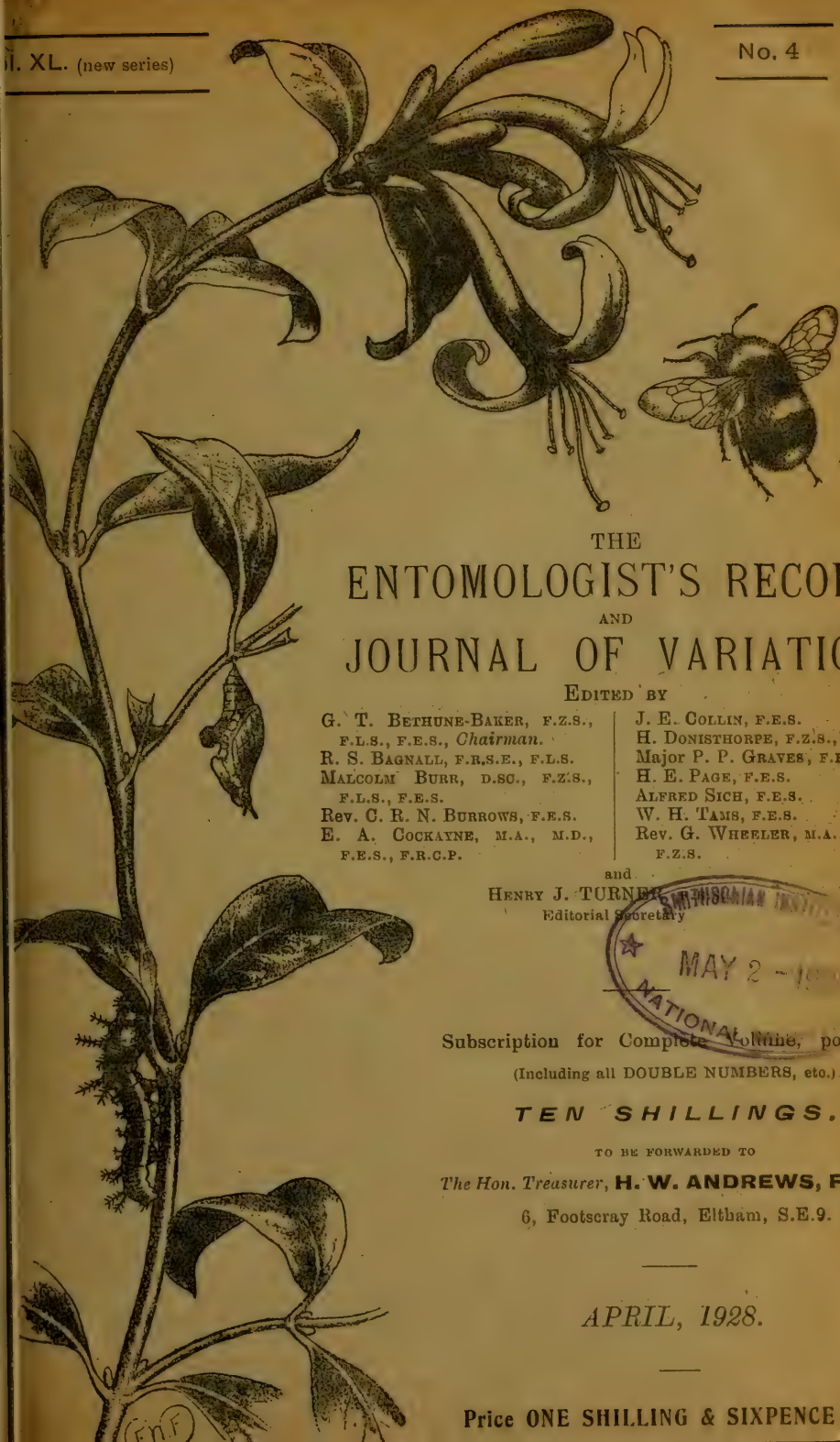
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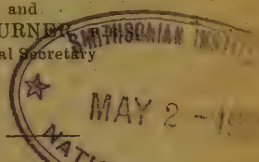
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JOURNAL OF VARIATION

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EDITORIAL.

We are glad to be able to inform our readers that we are strengthening our panel of Editors by the addition of our esteemed correspondent Major P. P. Graves. He has been a valued contributor for over twenty-five years, and we welcome him very heartily on to our panel. He is a special Correspondent to the *Times*, and his articles on the near East have attracted wide spread attention. His intimate knowledge of the peoples and changing politics of that large and of disturbed region of Europe is probably scarcely equalled, whilst his knowledge and field experience of the fauna of all that area and of the Mediterranean Basin is unsurpassed by any observers known to us in Europe. He will bring much literary ability to our pages and we welcome him warmly.—G.T.B.-B.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

VII. THE LUENA RIVER.

The Luena is a small river that runs into the Zambesi, separated by a narrow and not lofty ridge from the Kasai along which Livingstone passed, which falls into the Congo system. The eastern portion of the high plateau of Angola is well watered by a regular herring-bone series of streams with innumerable small tributaries and affluents. They all have wide boggy banks with a gentle slope up to the dry sandy ground of the flat ridges that separate the streams and are covered with forest, though in places, especially in their upper portions, they have a winding course in a narrow ravine that is often picturesque.

From our headquarters at Villa Luzo, the administrative centre of the District of Moxico, which adjoins the Congo and Rhodesian frontiers, we made a small excursion down the Luena for four or five days to the falls, which are a small and picturesque Niagara, thence struck northwards, circling around over a few streams that feed the Lumeje, a river running to the north of the Luena and falling into it a couple of days' march below the falls.

From Villa Luzo to the falls the forest is thin, with little undergrowth and not much life; the trees remind me of small oaks and mountain ashes, while there are others with leaves like walnuts and magnolias. It is now the African dry season or winter, and the autumn tints are creeping over the forest, yet there is a sign as of spring, for young leaves are shooting forth at the same time. The weather, with dry, bright sunny days, reminds one of a fine September or October at home, and it is cold at nights. Yet the Orthoptera suggest the early summer, for the Acridians and Locustids were mostly immature in the beginning of May and have been reaching the adult stage during the month. Now, at the end of May, adult specimens predominate, though the Locustids seem behind them and the Mantids and Phasmids are seldom found fully grown.

I am struck by the scarcity of Locustids. The commonest is a medium sized *Conocephalus*, very like our common south European *C. nitidulus*. It strikes up its note towards dusk, is vigorous for about a

couple of hours after dark, and then is silent. It has a characteristic buzz, very penetrating, with marked ventriloquial effect; when you approach to close quarters, you can distinguish an underlying drone, which I have not noticed in other Locustids; when stalking one I came upon it from behind and saw that not only the elytra were rubbing in the usual way, but the wings were partly elevated and were shivering, and it is this that causes the drone, which is audible only at close quarters. They are shy and active, and required patient stalking, but do not appear to be startled by the glare of an electric lantern in the dark. The normal colour is green, but now the dry season is well advanced, green specimens are rare, for they seem to turn a brownish yellow about a day after emergence from the nymph stage, so that they assimilate closely with the dried grass which is their favourite haunt. Green specimens are now rare, and for some weeks I have not seen an immature specimen, but took one in the transition stage, like our familiar *Metrioptera grisea* of the south of England, which retains green patches, especially on the flanks of the pronotum, for some time after completion of growth, and this green gradually turns to the characteristic grey.

In one locality, near the falls, in long grass on the boggy banks of the Luena, I found a few males of a much smaller species of *Conocephalus*; these were all still tender and freshly emerged, and perhaps for this reason their stridulation was feeble; they were still in the green stage, but had I been there a day or two later, I have no doubt that I should have found them turning brown.

Two or three species of *Xiphidium* occurred; these were mature sooner, and I have not noticed them recently; there is one with abbreviated wings, very like our *X. dorsale*, and one with fully developed organs of flight, like the common S. European *X. fuscum*: of this I did not take many, but the later specimens were brown.

Phaneropterids are rare; from time to time I pick up what I take to be *Phaneroptera nana*, the small African species which just reaches the south of Europe. It is smaller than the central European *P. falcata*, which I hope to hear before long has been re-discovered in Cornwall. I took one member of this family recalling the south-eastern *Acrometopa*, but very much smaller.

Of the *Phasgonuridae* and *Decticinae* I have not seen a sign, but in clearing undergrowth for camping have found two females of a *Mecopoda*, like the Oriental *M. elongata* but smaller; I hope soon to find the male, which should have a very distinctive chirp, as the Chinese are said to keep the males of this genus in cages for the sake of their song.

The fat sluggish *Heterodidae* are represented by a species less than half the size of the big fat fellow that I found in swarms at Benguela Velha on the coast. In the country near the falls there was plenty of it, chirping all the morning in shrubs and long grass; they are easy to take when on grass, as they climb high up and their squat figures are visible against the background; their note is rather feeble, but they can be stalked down without much difficulty and picked up with the fingers by the prickly pronotum, though if frightened they drop down to the ground and hide among the roots. Like the great obese *Bradyporidae* of the Balkans and Pontic area, which they resemble in so many respects, they squirt out a yellow fluid when handled; this

may be startling, but seems quite inoffensive. On the higher ground around Villa Luzo at the end of the month I can find no adult specimens, but immature ones are far from rare.

The most interesting Locustid is a dwarf Sagid; compared with the monsters of the Balkans it is like a domestic cat compared with a cave lion. In Africa I had expected to find monsters, and was surprised to come across this diminutive carnivore; perhaps the explanation is that this small form represents the ancestral type that finds so much competition here in the rich fauna of rapacious insects that it cannot develop, that it formerly extended over Europe in Miocene days, and when the hippopotamus and other creatures now restricted to Africa became extinct in Europe, the *Saga* lingered on in the south, found less competition, and were able to develop into the formidable monsters that we used to find in Macedonia, fierce giants of the insect world.

Among the crickets I have little to report; they are here, for we hear in the evenings the song of several species, but they require time and patience to catch them; our stock of the latter is not too bad, but after all, it was not to catch crickets that we came to Africa, and we have work to do. When sweeping in the bogs, I found the quaint little *Tridactylus* which occurs practically throughout the warmer parts of the Old World, and is perhaps not a cricket at all, but a special thing on its own account; also the Prussian-blue-with-orange-legs *Trigonidium cicindeloides*, which is also found in tropical Asia and southern Europe; it is a good hopper, but cannot compete with *Tridactylus*; this tiny little fellow leaps like a flea, and is difficult to take, for though the net may be full of them, they clear out from the bottom of it in one spring before one can catch them with the fingers. In the same place I took two or three of a very small *Nemobius*.

But it is among the true grasshoppers that we find the greatest abundance both of species and individuals, in Africa. There is a homely touch in the various Stenobothrids, which so closely resemble several of our common European species, and may be identical with them, or represent their ancestors; it seems to be more likely that Africa, with its immense expanses of grassy savannahs and great wealth of grasshopper life, is the original home of this group, than the steppes of Siberia with their long hard winters; from the point of view of the grasshopper, there is really no winter in Africa. An *Acrida*, perhaps identical with our common S. European *A. turrita*, is common enough, but not so prominent as in Europe; there are two or three species of small Truxalids of the *Acrida* type of build, some grey and fawn, others green, mostly with clear wings, but some with pink. These all assume the grass-like elongated type of body, and the *Mesops*, Opomalids and several others do the same. Some of the latter have very distinctive coloration, with a sharply marked pale lateral band, either of pink, or glistening silver, which blends closely with the striped light and shade of the tall grasses they frequent.

The Pyrgomorphids are better represented than in Europe. The common species, either green or brown, with rosy wings, is very close to south European *P. rosea*, and there is an allied form, also with red wings, twice the size. But it is in this group that we get brilliant and oily coloration; one of the commonest is a small green or brown and yellow species with abbreviated wings. But the most striking is

Phymateus morbillosus, a big fellow, big as a locust, bright grass green in colour, with gorgeous wings of crimson and blue; it is thickly studded with red knobs on the pronotum; the abdomen and legs are bright blue and yellow-green and the elytra are marbled with indigo. Its appearance is so distinctive and strange that one expects to find distinctive habits, but I have not yet noticed any; I have found it in long grass, the bright green blending with the still green grass in the bogs. The boys have brought me a single specimen of a much smaller species of the same genus; the pronotum has the knobs, but is reddish all over; the elytra are plain green, the wings brilliant orange and the hind tibiae bright yellow. Another handsome fellow, as familiar to me as a museum specimen as *Phymateus*, clearly belongs to a different genus, but the uniform is fine; it is of a plain brownish dark green, the posterior femora mottled with yellow, the tibiae purple, and the wings brilliant orange, passing to smoky at the tips.

The greatest wealth is in the Acridians in the narrow sense; there are several species of big locust like *Cyrtacanthacris* and allied genera; there is one big female, yellowish brown and dark, that rises with a clatter like a cock pheasant and dashes off with a clattering flight to a good distance; with his noise and his size and his brilliant red wings, he is a prominent insect, but active and difficult to catch. There are several of the locust type, with varying patterns of quiet greys, browns and fawns, and a considerable variety of the Caloptenid type, with sturdy body and varying patterns. I seem to have about thirty of this group, with different patterns, some very stumpy and stout, some with extremely long spurs on the posterior tibiae, some with long wings, others with short ones. They are mostly brown and fawn. One small common Acridian has a different type of coloration; it is pale green with purple wings.

The Acridians often have a different coloration when immature; the pinkish buff locust *Schistocerca peregrina* has black and orange larvae; the dull grey *Acridium aegyptium* has yellow or green larvae; this is probably to assimilate them to their surroundings in the different seasons at which they occur in different stages of their development. Here the adult Acridians are mainly brownish, fawn, buff or yellowish, to mingle with the vegetation of the dry season, but the larvae seem to be all green.

Oedipodidae are not prominent in this grassy and woodland country; we sometimes see the yellow and black wings of an *Oedaleus*, an occasional *Acerotylus*, close to, if not identical with, our European species, and in the sandy patches in our camps the red or orange wings banded with black of a common African species the name of which escapes me; I believe it is *Morphacris*.

Tettigidae behave as in England; there are three or four species; some are of the long, slender type, like our *T. subulatus*, and these seem the commonest; with them occur the stumpy type, like our *T. bipunctatus*; one tiny representative of the latter type is spiny like a diminutive hedgehog.

Of Phasmids I now see only quite young specimens, all of the very slender stick-like type. Mantids are beginning to appear in the adult stage, which they probably attain rapidly; in the middle of May I took a very small larva of that strange Mantid *Harpax*; with its broad little abdomen with appendiculated segments, tucked upwards over its back,

its broad raptorial legs, lobed head and pronotum, it is a very strange little fellow; it is mainly white, with an irregular greenish pattern, and looks for all the world like a spider; towards the end of the month I found them more developed, and more easily recognisable as Mantids, but still very uncouth; now at the end of the month I have taken the nymph stage and I expect in a week or two to find the adult. It is noteworthy that the adult insect has a prominent eye-spot on the middle of the elytra; in the younger insect, before the organs of flight are developed, its function, whatever that may be, is fulfilled by a similar spot on the corresponding surface of the abdomen.

Empusa, which is adult in May and June in the Mediterranean, was fully grown when I was at Loanda in the middle of April; up here I am now finding young larvae, which is what one would find in south Europe in the later summer. The seasons, according to our ideas, certainly are mixed up out here.

But the Mantids are rapidly reaching maturity. In the middle of May I often used to find the quaint little *Pyrgomantis*, with acute pointed head, scuttling up the sides of my net at a fast run, for it is a nimble little fellow; but these were all immature and it was late in the month before I got an adult. Now I am finding a few adults of a small, pearly-grey, clear-winged Mantid like *Ameles*, and the boys brought me a fully developed female of a big green one, probably *Sphodromantis*, but of this group of genera I have, apart from this, found only quite young larvae. A very long, slender Mantid, more like a Phasmid, also occurs, but very few are yet mature. Once in my net I thought I had a curiosity, a Mantid with clear wings like dragon-flies, but it must be a *Mantispa*, of the Neuroptera.

I have not worried much about Blattids, but bottle such as come my way; they are not very numerous; sweeping brings in, from time to time, small nimble species like our *Ectobius*, which are probably Phyllodromiids, and sometimes an unpleasant, black, apterous creature under rubbish.

I had very much hoped to make the personal acquaintance of a number of African Dermaptera, as I am more familiar with them, but they are few and far between. I have so far seen five species, three of which have been mentioned in previous letters. The other two are characteristically Ethiopian. The *Echinosomatinae* are a small subfamily characterised, among other things, by having the body and elytra studded with short, stiff bristles; they are said to live in colonies in rotten wood and are represented throughout the tropical parts of the Old World. In Africa there are several species, but many have been discriminated on grounds of colour alone. There are certainly two dominant species *Ech. afrum*, described by Palisot de Beauvois as long ago as 1805, and quite common in collections, which is characteristic of the forest region, and *E. wahlbergi*, Dohrn., of the Savannah country. I have examined a good quantity of rotten timber and found nothing but ants and termites, till under the bark of a standing tree I came across three immature *Echinosoma*. It is impossible to determine the species.

Under the same bark I was delighted to find some *Apachyus*, unfortunately not yet fully grown, and the boys have sometimes brought me some more from the logs of our camp fire. The genus *Apachyus* is very sharply defined and forms a subfamily, if not a

greater division, of its own, and is represented through the Old World tropics. In Africa we have certainly two species, *A. depressus* described from the West Coast by Palisot de Beauvois in 1805, and *A. murrayi*, Dohrn, a smaller species very close to it. They are remarkable insects as flat as a piece of paper, and with several peculiar structural features, and are very specialised for life under the bark of trees; they are very active, as are all earwigs, and with their sickle-shaped forceps even the nymphs can give a nip that the human finger can appreciate and they must be quite formidable to small insects; probably they feed on the termites that infest rotting timber in such vast quantities. Of these two African species, *A. murrayi* appears to be confined to the equatorial forest area, but *A. depressus* extends further up the West Coast to the north west and right into the eastern and southern portion of the continent. I used to consider the former as a mere diminutive geographical race of the latter, but Rehn has decided on its specific distinction. It is noteworthy that this diminutive form is restricted to the West Coast, where dwarfed forms of hippopotamus, buffalo, elephant and man occur.

One evening I found an earwig crawling on my hand and was delighted to think that at last I had made the personal acquaintance of one of the strange *Diplatyidae*, about which in the old days I had written a good deal. A closer inspection showed that it was certainly a very strange Diplatyid, and at last I realised that it was a Staphylinid beetle (*Cryptolium africanum*, Frm.,) and not an earwig at all. And so I was just as disappointed as with the *Mantispa*.

(To be continued.)

Miscellaneous Notes from Argentina.

X. ANTS IN FLOODED AREAS.

By KENNETH J. HAYWARD, F.E.S.

It has for some time been a mystery to me how it was that ants were always to be found in such vast numbers in the esteros, tracts of low-lying reed, or grass-covered areas, that become vast inundated marshes after heavy rains. That the inhabitants of the thousands of ant-hills retired to the top of their nests had to be ruled out, as for the greater part the mounds are completely submerged during the summer months after the spring and early summer rains, and it was clearly impossible that the ants could retire to the higher land, at any rate from the greater part of the area, as the esteros become inundated very quickly, often in a few hours, when rain is heavy. A possible explanation of the speedy repopulation of these marshes when they again dry was revealed to me when duck-shooting during February of this year (1928) in the estero Mocovi. The water was from two to two and a half feet deep on the average, and all ground and ant-hills were totally submerged. I early on noticed patches of brown clinging to reeds and water weeds above water level, and thinking them dead vegetation took no further interest till late in the afternoon I passed close to one, and to my surprise found it a seething mass of small red ants. The insects were balled up on the plant stalks sometimes on a single stalk, more often they had chosen a spot where several reeds

grew close together. The "balls" varied in size from that of a marble to larger than a tennis ball, sometimes a single ball, more often several close together. The ants were in continual movement, and amongst some of the balls I broke up were larvae of some coccinellid and one or two very small unidentified beetles. Winged males and females were present in one or two cases, and as the estero in question had been inundated for at least two months, this seems strange. I at first thought the ants had taken advantage of spiders' or other webs on which to ball up, but in every case the ants were simply clinging one to another, those on the reed stems bearing the weight of the whole surviving colony. Since the date of this discovery I have noticed the same thing in many other marshes when shooting, and in it I see a possible explanation to what had previously puzzled me. Presumably the ants, who have thus escaped drowning, are able to maintain life until the waters subside, when they re-occupy and re-condition their old nest, and carry on the colony.

Some Aberrations of Coleoptera not previously recorded for Britain.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

Philonthus albipes, Gr., ab. *alpinus*, Epp.—In this aberration the legs are nearly black or, at any rate, dark brown in colour, which is, of course, very misleading. Moreover, as *P. albipes* should come into the second division of the species with thorax consisting of four punctures, i.e., those in which the first joint of posterior tarsi is not, or hardly, longer than the last, and not as long as the three following united, instead of in the first division as stated by Fowler, it was quite impossible to identify dark legged-specimens. I am indebted to Colonel Deville for the name. This ab. occurred sparingly, in company with the typical form, in manure heaps in Windsor Forest on May 3rd, 31st, and subsequent dates in 1927.

Mycetophagus A-pustulatus, L., ab. *rupeicollis*, Schils., and ab. *antemacularis*, Torre (*bipustulatus*, Schils.).—These two abs. were found with the typical form, which was very abundant in oyster mushrooms (*Pleurotus sapidus*) on elm trees, and also in a "fungus dump" in Windsor Forest on October 11th, 1927. In the former the thorax is red (I took this form at Axeman Street, Cambs. 24.VIII.21) instead of black as in the typical form. In the latter the two yellow apical spots are missing.

I also took a specimen in which only three spots were present; one of the basal spots was missing, and the other basal spot being very small. This was approaching the ab. *postmacularis*, Torre, in which the basal spots are wanting. There is also an aberration on the continent in which the whole elytra are black—ab. *erythrocephalus*, Er. Those two last named abs. have not yet been recorded for Britain. I intend to hunt for them this year.

Dr. Verity's Nomenclature; a Reply.

By P. P. GRAVES, F.E.S.

Owing to absence abroad I have had no chance yet of replying to Mr. Wightman's criticism of my criticism of Mr. Bethune-Baker's criticism of some of Dr. Verity's names. I will endeavour to do so now as briefly as possible.

Mr. Wightman and I start from Art. 14 of the proposed Rules given in the Report of the British National Committee on Entomological Nomenclature and arrive at very different conclusions. Mr. Wightman's line of argument is in brief:

(1) The phrase 'geographical variation' in Art. 14 should be interpreted as follows: "When a colony of an insect (which . . . is deemed to be conspecific with species already named) inhabiting some definite geographical area has some special facies present on ALL its members, which would distinguish them from similar forms found outside this area, we have a geographical variation and a subspecies."

(2) In the case of Dr. Verity's 'races' such a special facies is not present in *all* the members of a species inhabiting a defined area. Therefore these races are not subspecies.

(3) Dr. Verity has on occasion allowed himself to bestow racial names on forms which do not merit such a distinction.

(4) In spite of Mr. Graves' 'high-sounding' terms (I presume Mr. Wightman refers to 'onomatophilia' and 'onomatophobia') 'the naming of distinct forms at all is being brought into question by workers of standing' who are 'complaining that naming has already been carried too far and that (*sic*) some rule should be introduced' which will restrict all naming to species and subspecies.

To this I would reply:

(1) As long as there is no generally accepted definition of 'race' and as long as the proposed rule 14 merely defines a subspecies as a geographical variation and does not refer at all to 'races,' it appears to me to be necessary to abide by the strict letter of the proposed rule until a better has been drawn up by a representative and, if possible, an international body.

Mr. Wightman proposes an interpretation of the phrase 'geographical variation'; we can all do that, but such interpretations are individual and unofficial. I may add that what I am tempted to call the '100% subspecies' may often be difficult to establish in fact. An affirmative implies a negative. If we postulate for a subspecies the presence of a distinctive facies in the case of ALL its members we are logically driven to deny the title of subspecies to a geographical variation if ONE specimen found in a 'definite geographical area' does not conform to the facies of hundreds of others found in the same definite area. Can we assert of many universally recognised subspecies, that they are so far advanced in their evolution as to be incapable of occasionally producing the distinctive facies of another subspecies of the same species even in their most isolated habitats. To take concrete examples, are we to deny subspecific rank to the extinct British *dispar* because there may be some evidence of the former existence of individual *rutilus* among *dispar* in England? Are we to depose ssp. *deserticola* of *Melitaea didyma* because a single ♀ taken in the Egyptian desert presents a Central European facies? Are we to

cease to regard the subspecies *therapne* of *P. sertorius* (*sao*) as a subspecies because Turati has recorded the existence of a few individual *sertorius* (*sao*) among Sardinian *therapne*?

Doubtless all individuals of the ideal subspecies should present a certain distinct facies and no other but—can we prove a negative?

(2) Some of Dr. Verity's 'races' seem to me, as far as I can judge from a most imperfect acquaintance with his splendid collection, to be 'subspecies' in the most restricted sense, while others do not.

(3) Here Dr Verity would no doubt plead guilty to occasional past lapses.

(4) A. Onomatophobia is a convenient summary of the phrase 'an excessive dislike of giving names to variations.' I thus use seven syllables and thirteen letters for fifteen syllables and forty-two letters—which saves space.

B. 'Workers of standing' will not be regarded as such for long if they refuse to name 'distinct' forms at all. Excess in one direction does not justify excess in another. Meanwhile shall we entomologists be the happier and better for dropping 'racial' names and many sub-specific ones and referring in future to, say

M. athalia of Paris (Geoffroy).

„ „ of Tavistock (Verity).

„ „ of Mt. Vitosh (Fruhstorfer).

„ „ of Mehadia, Rumania and parts of the Balkan Peninsula and Anatolia (Gerhard).

etc., etc.

Lastly may I say with regard to the particular case under discussion between Mr. Bethune-Baker, Mr. Wightman and myself that *Pararge aegeria vulgaris* was the distinctive name given by Zeller to the *aegeria* of Central Europe and part of Southern Europe, which differs widely and generally from *P. aegeria aegeria*, while the name *vulgaris* was given by Verity to the Tuscan type of the subspecies of *Pararge maera* from Central, South Western and Western Europe in order to distinguish it from the Scandinavian *P. maera maera* and the Eastern *P. maera orientalis*. This fact has no bearing on the question at issue, viz., the value of Dr. Verity's names, but it clearly forbids the use of *vulgaris* as the third of a trinomial more than once in the genus *Pararge* whether it is used to include *P. aegeria* and the *maera-mejera* group of species or not.

Notes on *Angerona prunaria*.

By MAJOR STUART MAPLES.

In the larger woods of Huntingdonshire, this moth is very plentiful in a normal year, from the end of May onwards, the plain orange form and the banded being equally common, whilst dark speckled forms are obtained occasionally.

As a resident in the County, I started some years ago to breed this species with a view to improving it in size and observing results of selective pairing, e.g., plain orange ♂ × plain yellow ♀, banded ♂ × banded ♀ and by using both forms intermixed both ways.

The results from these pairings were both gratifying and encouraging, the bred insects being much larger and finer than in the wild state,

though I could have wished for better results in the speckled form, they seem by far the most difficult to obtain.

Last year having some imagines bred from a Sussex locality (which had been inbred for some time) I resolved to try assembling, and for this purpose took several newly emerged ♀ ♀ in small cages to a wood where the moth abounds. The results were, on the whole, satisfactory. As many ♂ ♂ as I desired were duly boxed, and upon arrival home I proceeded to examine my captures, selecting only those which showed the best markings for pairing.

Amongst this lot of ♂ ♂ was a fine *corylaria* (= *sordata*) with the usual characteristic markings, but with the band unusually dark, almost approaching black.

The orange is exceptionally brilliant, with a good deal of freckling, and there is more orange on the hindwings than in the usual form of this variety. It has been greatly admired by those collectors who have seen it.

This very beautiful insect I succeeded in pairing with a well-marked ♀ *corylaria*. Fortunately the ova were fertile, and the ♀ deposited some 60 ova the first night after pairing, and about the same number on the second, and a few more on the third. These hatched in 14 or 15 days and the larvae were sleeved out on lilac until September, when they commenced hibernating, and they were left undisturbed till the severe weather, when the sleeves were cut down and hung in an outhouse.

In early March the sleeves were carefully examined and found to contain a fair number of larvae which, together with the dead leaves placed in the sleeves for them to hibernate in, were placed in cages. So far they are making no attempt to feed, for the most part remaining amongst the dead leaves at the bottom of the cage.

Treated in this way they come through the winter very well, starting to feed in early April, the imagines emerging usually about the third week in May, till mid-June.

Variation in Lepidoptera I interpret as meaning deviation from the usual type of the same species, and I find it a most fascinating study. It is surprising that this magnificent insect is so little thought of, or bred for varieties especially by those who admire the Geometrids, many of which give such striking variation.

Privet and lilac seem to be the most satisfactory foods, and among the other recorded foods, garden mint seems especially acceptable. It chiefly feeds by night, which seems to account for the fact that I have never yet come across a collector who has found it wild. This is most extraordinary, as we who live near Monks Wood beat its reputed food-plant, namely blackthorn, most assiduously for the local Theclid larvae from about May 20th to June 20th, *i.e.*, at the time of year when there must be thousands of orange moth larvae in these same woods.

In conclusion may I refer those who are, or may become interested in this glorious Geometer to an excellent article on the species by Mr. L. B. Prout in the *Ent. Rec.* Vol. XV. (1903), pp. 149, 150, where they will find that up to that date only eight varieties (or aberrations) had been described. As three of them have never occurred in Britain, there is ample scope for would-be specialists to pursue further investigations in this direction.

The Mendelian heredity of this species was fully worked out (1903,

1904) by the late Professor Leonard Doncaster, and a study of the seven resulting family tables will reveal to us what may be expected from any one of that number of pairings that are possible.

Nomenclature.

By W. PARKINSON CURTIS, F.E.S.

It is fairly obvious from Vol. XXXIX. of this journal that there is the strongest diversity of opinion on the degree to which naming should be carried. I could have seen the point of Mr. Wightman's note if he had said I ought not to have renamed the *tritici* aberration, and even now I suppose my name will not be recognised officially, at any rate for the present, since it falls below the lower limit of recognition proposed (as I believe erroneously) by the Nomenclature Committee. I had really intended not to put my spoke into the controversy over names, but having gone so far I cannot refrain from saying that I think Dr. Verity has been a little hardly used and his great services to entomology are being a little dimmed by what I hope are merely passing clouds.

I cannot say I agree entirely with either the "splitters" or the "lumpers," but I can say how very inconvenient it is to try to refer to any object when it has no name at all, or a name which might easily induce the person to whom one's remarks are addressed to think of an entirely different object. Such a position is no help to progress.

The naming of mere aberrations not likely to recur regularly and in identical form seems to me rather a silly practice, because it gives no help in understanding a species. The most such "freaks" deserve is a class name showing the class of freak they are, but different names for specimens of the class, based on the amount of "freakishness" displayed, seems tending to reduce entomology to the level of stamp collecting, where collectors have series of stamps showing different tones of red or blue, or whatever it may be, which were dependent, most probably, on the quality or amount of ink on the plate.

The naming of recurrent forms, especially where you have, as you have in *Euxoa*, doubtfully distinct species exhibiting parallel variations seems a very convenient practise from two points of view.

First of all it shortens tabular comparisons and comparative literature. Secondly it encourages collectors to amass long series of specimens with precise data. The former aids the writer who chooses to write on variation and specific distinction; the latter enables the biologist, who is seeking to discover the causes and tendencies of variation, to command an amount of material for study that he certainly would never otherwise have access to.

The shortness of the average British collector's series and "Oh! no, all caught in Britain, no foreign stuff craze," is no doubt the explanation of Dr. Verity's British discoveries noted by Mr. Graves at p. 168.

The naming of a variation focusses attention in a marked and desirable degree.

I feel that the naming of variations seasonal, geographical, and local, and of regularly recurrent colour variations, might be made a key to

their development and character, but the system (or want of system) in naming at present in vogue, which is largely capricious, will have to be recast even if it means dethroning such names as *nigra* and *rufa*, and keeping them for black and red races or varieties.

I believe that much of the strongly expressed objection to the multiplication of names would, if carefully analysed to bedrock, be found to spring from a very natural disgust at such childish methods as those pursued by Suffert in *Iris* with for example *Papilio*, where he has named an aberration of *policeses*, *liponesco*; of *cynorta*, *nycorta*; of another *Papilio benio*, because it had already an ab. *niobe*; and the method of giving the same class of variation unrelated names, e.g., *thompsoni* of *nebulosa*, *varleyata* of *grossulariata*, *valezina* of *paphia*, *doubledayaria* of *betularia*, give not the slightest key to the fact that they all represent darkened forms of a normally light coloured insect.

It is in my opinion here that the authorities should act; that they can stop a convenient practice by a form of outlawry is not I think possible, and the attempt will simply put them in the position of passing a "Leeman's Act."

Ignoring these names in the Zoological Record is merely putting a premium on wholesale confusion at a later date and detracting from the value of that publication. I have no use for a Digest of Cases, which in the opinion of the Editors are sound decisions, nor has any lawyer. We want all the decisions, good or bad.

If you cannot dam a river, you can usually regulate its flow into convenient and useful channels, and the latter course is much more beneficial to those that need the water at a lower level.

NOTES ON COLLECTING, etc.

LARVA OF ODEZIA ATRATA ATTACKED BY A SPIDER.—On May 24th, 1927, at Mill Hill, as I was looking at a plant of *Bunium flexuosum* I saw a larva of *Odezia atrata* make a slight movement. It was seized immediately by a brown flower spider, *Thomisus* sp., which bit it on the side of the second abdominal somite. The larva jerked itself violently and fell with the spider still holding it, but in my attempt to capture both I lost the spider. The larva bled a little but recovered from the bite. Most entomologists believe that spiders eat larvae, but the sight of one actually attacking a larva under natural conditions must be a very unusual one. I had not disturbed the plant and the movement of the larva was quite spontaneous.—E. A. COCCAYNE (A.M., D.M., F.E.S.), 116, Westbourne Terrace, W.2.

CURRENT NOTES AND SHORT NOTICES.

The first number of the *Ent. Mitt.* for 1928, contains a large number of interesting and important articles with two plates and many text figures. Dr. Corti contributes No. XV. of his studies of the *Aprotidæ* describing and figuring 5 new palaearctic species. We might say that anyone interested in the Noctuae, who passes through Zurich, should certainly try to see the wonderful collection of this family made by Dr. Corti. It was on view during the Congress of 1925

and many lepidopterists visited it. In the same room were the results of the wonderful work of the late Dr. Standfuss in his temperature experiments. The remaining articles deal chiefly with Coleoptera, Diptera and Hymenoptera.

In the *Bull. Soc. ent. France*, No. 18 (1927), M. Dumont contributes descriptions of the larvae of two species of *Erastrinae*, which fed upon Coccids. The writer fed the larvae for weeks on several species of Coccidae and finally bred out the imagines, *Eublemma deserta* and *E. virginalis*.

In the current number of the *Vasculum*, Prof. J. W. Heslop Harrison in a short article on "Melanism in *Polia chi*" refers to the plate issued by the Royal Society in 1901, when it instituted a collective inquiry as to progressive melanism in moths and upon which the result of the enquiry was based in Doncaster's report in 1906 (*Ent. Record*, Vol. XVIII.). On this plate were three figures of *P. chi* purporting to be "28, a light male; 29, medium male; 30, dark male" respectively. These figures have been critically examined by Prof. Harrison, he states that "28 is a typical male, 29 a freshly emerged var. *olivacea* and 30 a worn female! of the same form. So far as this species is concerned the whole research is abortive" In a footnote he says that "for various reasons this statement holds true of other species figured on the plate."

The *London Naturalist* for 1926 issued in the later half of last year contains an unusual amount of Entomology. The first article is a summary of a paper on "Insect Vision," by J. H. Burkill, F.L.S., in which he traces from early times the gradual development of our knowledge of the interdependence of flowers and insects, and relates the various experiments made by different observers. Unfortunately he has omitted some of the more recent investigations such as those of Dr. Eltringham (see *Trans. Ent. Soc. Lond.*) Then there is a description of an excellent piece of observation on the Life-history, etc., of a rare British sawfly, *Pteronidea spiraeae*, by J. C. Robbins, F.E.S. C. Mellows, M.A, F.E.S. deals with "Some Problems of Butterfly Migration" in a long, detailed, comprehensive article. The Problems are Where?, Why?, How?, Purpose?, Opportunity?, Impulse?, Instinct?, Remain?, or Return?. Normal Dispersion or Evolutionary Purpose? A large number of records of the occurrence of plant galls with a few notes are contributed by A. J. Burkill. With the other matters Botanical, Ornithological, etc., a quite excellent annual has been issued. There are four plates.

Dr. Horn, of the Deutsche Entomologische Institut, is about to issue a new edition of the famous *Bibliotheca Entomologica* of Hagen, a work which contains the names of entomological authors and the titles with dates and many details, of all publications on entomology. This work was originally brought out in 2 vols. at the end of 1863. Although containing a vast amount of information on all works up to that date Dr. Horn has been able to add no less than 8,000 titles. The Series I. of the new Index will be issued in 4 vols. at the price of 12.50 Mk. each. It is intended to continue the work to comprise all authors and titles for the period subsequent to 1863. The whole will be one of the most useful and necessary pieces of work which has appeared for many years past, and we wish Dr. Horn and his collaborators the success they will deserve.

There is an important note in the current *Bull. Soc. Ent. Fr.*, p. 25, on "The parasites of Aphides and their hyperparasites," which is of considerable importance to economic entomologists.

The *Zeit. Oesterr. Ent. Ver.* for March contains a coloured plate and a description of still another form of the much-named *Parnassius apollo*. This is a wonderful black form captured in the Vienna Hochschneeberg in July last. Although *P. mnemosyne* produces black forms, up to the present *P. apollo* has never been reported as doing so. The captor, Anton Otto, has named it ab. *bergeri* in honour of the well-known Dr. Berger, President of the Ent. Verein.

The study of *Pieris napi* seems attractive to many an entomologist. In heft 3 of the *Verhand. Zoo.-bot. Gesell. Wien*, Herr Hans Kautz adds another memoir to the already long lists which have been appearing for many years past. Some years ago we made a summary in these pages of what had been done in the study of the variation found in this species, but of necessity it was more or less incomplete. A large amount of material from all known areas was needed to determine the stability of much that appeared to overlap, and the confusion of names it was impossible to clear without such. Herr Kautz deals first with general details and with what well-known authors have previously done. He then goes on to consider the generations in different areas, and the aberrations occurring in each. From that he passes on to races (both subspecies and races) dealing in detail with Dr. Verity's grades, of both generations. The last section is devoted to the consideration of the high alpine form *bryoniae*.

In the January number of this magazine, p. 15, we called attention to the founding of a new subspecies of *Cupido minimus* on 2 (recte 8) specimens. Owing to an unfortunate series of errors and the omission to refer to the original (*Bull. Soc. ent. Fr.* 1927, p. 244), both when the note was written and again when it was in type, it is much to be regretted, that an erroneous impression was produced at which the original author must naturally feel annoyed. Curiously enough simultaneously with the note, Capt. N. D. Riley of the Natural History Museum (B.M.), with considerable material and by examination of both androconia and genitalia was investigating this matter. The result is that in the *Entomologist* he describes it as a new species under the name *Cupido arcilacis*; the name of the latter description cannot stand, as the name *carswelli* was published a few days previously. Considerable further confirmatory material has come into the hands of both Mr. Riley and Mr. Stempffer. Thus we get in Spain a group of three very closely allied species *C. lorquini*, *C. minimus*, and *C. carswelli*.

Through the kindness of our correspondent, Capt. K. J. Hayward, of the Argentine, we have received a copy of the *American National Geographic Magazine* for July last. The notable article (to us) is one entitled "Strange habits of Familiar Moths and Butterflies." It is rarely that one finds in our general magazines articles so ably written and so ably illustrated. In about 50 pages, with 16 coloured plates and numerous half-tone illustrations, an admirable introduction to the wonder of lepidopterous lives is given. The paper concludes with short descriptions and notes of the species figured, some 150 in number, all American. The colour reproductions are most successful.

The Russian entomologists seem, from their publications, to be

working very thoroughly at their study, chiefly of course on those lines which are based on economic utility. In the *Revue Russe*, vol. XXI., nos. 1-2, we have 144 pages of closely printed matter with many illustrations, containing 24 memoirs. Among the contributors we note such well-known names as B. P. Uvarov, Semenov-Tian-Shansky, Kusnezov, Erichson, Boldyrev, etc. Although much of the matter is in Russian, short summaries are given in English, French, or German. Would that the Russian might be converted to the ordinary Roman type.

The *Boll. Lab. Zool. Gen. e Agrar.*, of Portici, Italy, vol. XX., contains the usual interesting and useful memoirs, eighteen in number, nearly all of which are illustrated by adequate diagrams. Three papers concern Lepidoptera: Dr. Romei gives notes on the butterflies and Zygaenids of Tripolitania, Sign. Colizza gives the life-history of *Tortrix prunubana* with details of its parasitism and figures of the parasites, Sign. Cuscianna deals similarly with *Simaethis nemorana*. Prof. Silvestri contributes three articles one on *Chalcididae*, another on the *Grylloblattidae* and a third on the *Polydesmidae* of Africa, Prof. Wheeler of Harvard describes the Ants, *Formicidae*, collected by Prof. Silvestri in localities in Indo-China.

We have received Part 1 of Vol. II. of the *Bulletin of the Hill Museum*, consisting of a hundred pages and one plate. The whole of the twelve papers deal with the collections made for the Hill Museum and are mainly the records of the work done by Messrs. Talbot and Prout and Miss Prout. Mr. Talbot contributes an account of his visit with Mons. Le Cerf to the Great Atlas of Morocco, and of his visit to Andorra, Pyrenees, with lists of the Lepidoptera met with. Mr. Joicey is to be congratulated on his able staff of helpers.

No. 3 of the *Trans. Hampshire Ent. Soc.* has come to hand. This Society with its headquarters at Southampton, now has 41 members, all of whom are practical and active entomologists. The reports of the monthly meetings are records of members' activities, and form interesting reading redolent of the sunny hills, of the green fields and of the shady woods rather than of the musty cabinet. The hunt for *Synanthedon flaviventris* has been taken on seriously, with the result that more imagines have already been bred out, but not commensurate with the numerous galls that have been found. Three papers are printed in full including Notes on *Psychophagus omnivorus*, a Pupal Parasite, by A. T. Postans, and Notes on *S. flaviventris*, by Wm. Fassnidge. The rest of the *Trans.* is taken up with Notes on the Season, Lepidoptera, around Southampton by Wm. Fassnidge, in S.W. Hants by Lt. S. A. Jones, at Alton by E. A. C. Stowell, Odonata, etc., in Hants, and Coleoptera in Hants by F. J. Killington, Aculeate-Hymenoptera by H. P. Jones. There are two plates, the gall made by the larva of *S. flaviventris*, and the markings on the thorax of *Agriion mercuriale* and on that of *Ischnura elegans*. The part is well printed and produced and a credit to all concerned. With such an advertisement no entomologist, worthy of the title, in Hants should omit to become a member of this flourishing Society.

Prof. Embrik Strand sends us descriptions of new varieties of palaearctic Lepidoptera which he had contributed to *Ent. Zeit.*, *Soc. Ent.*, *Arch. f. Naturg.*, and *Lep. Cat.*

REVIEWS AND NOTICES OF BOOKS.

We are in receipt of the English translation, by C. K. Ogden, editor of "*Psyche*," of Auguste Forel's "The Social World of the Ants" (*Le Monde Social des Fourmis*), published by Putmans, price 50.-. The original was published in five small volumes, but the translation appears in two. Vol. I. consists of xlv+551 pages; Vol. II. of xx+445 pages. As we reviewed* the original work as it came out, we do not propose to go over old ground here, but to give a short notice, and call attention to this most excellent production. It is most admirably translated, very well printed, with very clear type, on very good paper, and nicely bound.

It is undoubtedly a fact that the translation is far superior to the original work, in usefulness as a book of reference, and in every way. There is an excellent index of 38 pages, which increases the value of the work enormously. A thorough explanation of the plates, and figures, is given in each volume, and furthermore the latter are now arranged in their proper positions and sequence, and not dotted about the book indiscriminately. The credit is also now given to all sources whence the figures were obtained, or copied. The worst mistakes in the original work have been altered in the text itself, and in a footnote to the translator's admirable foreword (p. viii), a number of our criticisms and corrections are referred to. We must heartily congratulate the gifted translator on this very fine achievement.—HORACE DONISTHORPE.

We have received from that enterprising firm Messrs. Julius Springer of Berlin another of those comprehensive books of reference for which the German-speaking nations are famous. The present volume, *Index biologorum*, contains the names of all those who are professionally engaged in the investigation of the nature and phenomena of life, the lines of the work they have been, or are, engaged in, and the institution where their studies are carried on. The second part contains the names and numerous details regarding the various laboratories throughout the world, with the names of the staff. Finally there is added a list of periodicals which deal mainly with the study of biology. The book is closely printed in small, but very clear, type, and contains a huge amount of matter in its 550 pages. We presume that the author-compiler had to depend upon the information as it was supplied to him, but it is rather disconcerting to note that the British Museum, London School of Hygiene and the Imperial Bureau occupy 10 lines while the Bureau of Applied Entomology of Leningrad alone occupies 20 lines. In the former 3 organisations only five names are apparently worth mentioning, in the Russian Bureau there are eighteen names given. Perhaps in a future edition of this valuable work we may have a supplement giving the names of workers like Prof. J. W. H. Harrison, Dr. Hasebröck, Dr. E. A. Cockayne, etc., who are, as private individuals, doing yeoman service in the investigation of biological problems. The compiler is Herr G. C. Hirsch of the Zoological Laboratory, Utrecht, Holland.—H.J.T.

* Vol. I. reviewed in the *Ent. Record* 33 59-60 (1921); Vol. II. *Ent. Record* 35 38-40 (1923); Vol. III. *Ent. Mo. Mag.* 60 89-93 (1924); Vol. IV. *Ent. Mo. Mag.* 60 140-42 (1924); Vol. V. *Ent. Record* 36 173-77 (1924).

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—Several hundred species of Coleoptera (carded) from Hants and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Duplicates.—British Lepidoptera, many species.

Desiderata.—Back volumes of Trans. Ent. Soc. Lond., and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 51½, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of *christyi*, *abruptaria* v. *brunnea*, black *consonaria* and *bidentata*, *ensaria*, *curzoni*, *jasionata*, *venosata* (Shetl.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. *Herminia flavicrinata*, *Andreas*, *Nych. dalmatina* race *andreasaria*, Warnecke, about 30 species of rare *Acidalia*; pupae of *Eupithecia illuminata* or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

Duplicates.—*P. apollo nevadensis* and rare Palaearctic Rhopalocera, also African *Danaidae*, *Charaxes* and *Hypolimnas*.

Desiderata.—Many rarer and few common species Rhopalocera. European only.—W. G. Pether, 4, Willowbridge Road, London, N.1.

Duplicates.—Fine bred *prunaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Bred *Sparganii*, *Ochroleuca*, *Maritima*, *Straminea*, and many other Noctuae.

Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. May 2nd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. April 26th. May 10th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to H. J. TURNER, "Latemar," West Drive, Cheam.

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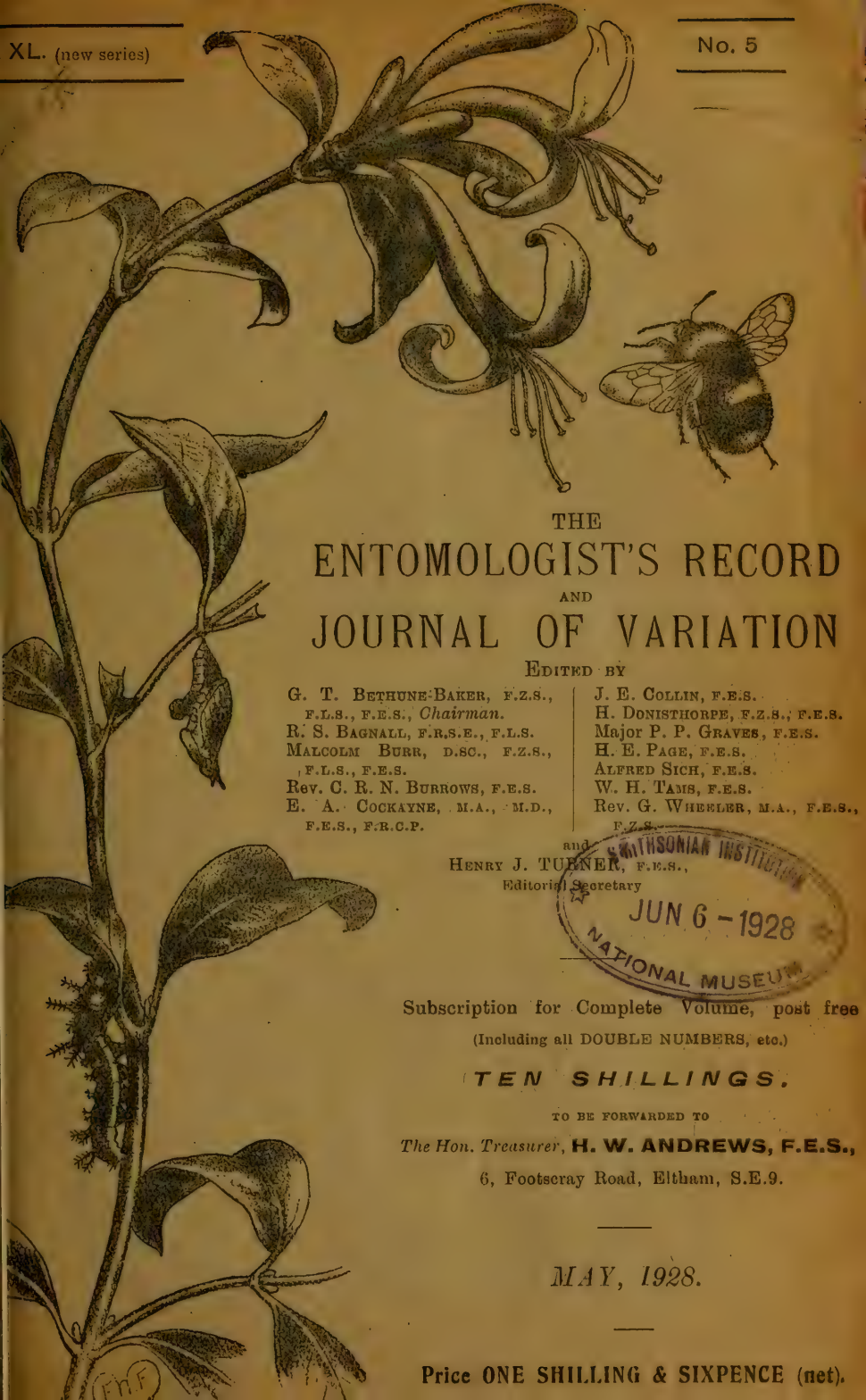
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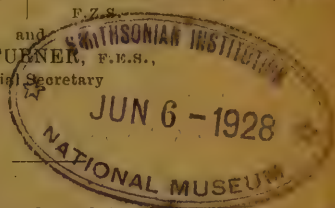
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JOURNAL OF VARIATION

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Collecting in Bulgaria, 1925 and 1927.

By P. P. GRAVES, F.E.S.

I spent two days at Chamkurya, in Bulgaria, on my way home from Portaria in 1925, and what I saw of the mountain country made me very anxious to return there. I collected on both days—for a morning at Slivnitza, near the village of Radwil on the upper waters of the Maritza, about 3,100 feet above sea-level, also near Chamkurya itself, in the clearings of the pine forest 4,300 feet above sea level, and at Varnik, about 3 miles W. of Chamkurya, where there is an outcrop of cretaceous rock. While I was there on the morning of July 26th, H.M. King Boris most kindly bade me accompany him to Sednyakovo (5,800 ft.) and Sary-Gyol (6,200 ft.) to collect *Erebias* and *Brenthis pales* subsp. *balcanica*. I was thus able to see a great deal of one of the best-known collecting grounds in Bulgaria in those two days, and to see many butterflies before unknown to me, save as specimens. Among these were *Limenitis populi* subsp. *vilocola*, *Apatura iris* (Slivnitza), *Parnassius apollo* (Slivnitza and Varnik), *Heodes virgaureae*, *H. hippothoe* subsp. *leonhardi*, *Hesperia alvens*, *B. pales* subsp. *balcanica*, and the *Erebias epiphron* subsp. *orientalis*, *E. oeme*, *E. ligea*, *E. euryale* subsp. *syrmia* and *E. tyndarus* subsp. *balcanica*. The collecting grounds up to Sednyakovo consisted mostly of mountain meadows, small or large, in a pine forest, mixed, especially on the lower ground at Slivnitza, with aspen, birch, willow, ash, and other deciduous trees. Above Sednyakovo, a dwarf pine scrub (*Pinus mughus*?) takes the place of the forest, and there are wide open stretches covered with flowers surmounted by the bare scree of the lower heights of the Musalla group. Sary-Gyol itself is a lake, still higher than the open plateau where I collected. This plateau crowns a very steep wooded slope, which must be nearly 2,000 feet high, descending to the head-waters of the Maritza. The view to the North-East is magnificent. To the South it is barred by the saddle which connects the Musalla group with the Rhodope Mountains.

I visited Chamkurya again in 1927 and collected at Sary-Gyol, with great success. I found a good, if restricted, collecting ground at Chornata-Skala, a remarkable crag in the forest above the Maritza about 3 miles from Chamkurya, taking *P. apollo*, *Pieris manni* and the lovely *Polyommatus eroides*, Friv., in spite of overcast weather. 1927 was quite a different year from 1925, when the season was late. The heat was terrific on my arrival in Bulgaria on July 3rd, and from July 10th to July 14th an 'upset' caused by abstention from drinking before nightfall kept me on my back. But I contrived to catch many butterflies which I badly wanted and thanks to the great kindness of King Boris, who took me on a most interesting journey on July 6th and 7th by automobile to the famous Kresna Defile and to the Rilo Monastery and provided me with transport to Kostenetz-Banya in the Rhodope, I was able to see some of the best collecting grounds in Bulgaria. I also received much help and advice from that kind and excellent naturalist Dr. Iwan Buresch, the Director of the Royal Museum at Sofia, who accompanied me to Kostenetz and also to the lower slopes of Mt. Lulin near Sofia. The Rilo region has been described by Mrs. Nicholl and other travellers and I need only say here that I collected in the woods near the Monastery at about 4,000 feet and did well. The Kresna

Defile, a long cañon where the road and light railway wind along the rocks which surmount the Struma, reminded me of parts of Greece and Asia Minor. The vegetation was very Mediterranean, an evergreen *Rhamnus* and a very thorny *Palurus* being particularly noticeable. The Shaitan-deré, a side-valley containing a brook which flows from the Pirin Mountains, is famous in Bulgarian entomological annals, and we would have done very well here, but for the drought, which seemed to have delayed the emergence of all the Satyrids, except one ♂ *Satyrus fatua* which the King successfully stalked, and a burning wind which seemed to have just left the Central Sahara.

I did not devote enough time to Mt. Vitosh, though on my one brief visit to the Dragalevtzi Monastery above Sofia (circ. 2,700 ft.) I took a ♂ *Polyommatus eumedon* and a worn ♂ *P. amandus*, which I failed to find elsewhere. Lulin is a mountain about 3,500 ft. high to the west of Vitosh from which it is separated by a valley, through which run a small river, the road to Dubnitza and the railway to Kustendil. The ground is steep and wooded on the Vitosh side, steep but generally open on the flank of Lulin, where I was shown a locality for a fine local form of *Parnassius apollo*. This species was over when I visited Lulin on July 5th, but many other insects were flying and on July 23rd I found huge assemblages of Lycaenids, chiefly *Plebeius argus* (*aegon*), many of which were unusually small owing to the heat and drought, and *P. icarus* at a 'drinking-bar,' a runnel overgrown with spear-mint and agrimony near the railway. Here too were other Lycaenids, single specimens just emerged of *Polyommatus coridon* resembling the nominotypical Styrian race, and of *P. anteros* (II. gen.) among them. This excellent locality is easily reached from Sofia by taking a tram to the suburb of Kniazhevo and then walking about a mile beyond that village. I might add that good light beer is obtainable at several points on the road.

I collected twice, on July 19th and 20th, in the narrow Isker Defile 2 miles above Pancharevo, which is about five miles from Sofia. Each time I worked a small patch of nearly level ground overgrown with elder, bramble and other bushes on the east side of the river and did well, taking *inter alia* the three species of *Everes*, *E. argiades*, *E. alcetas* and *E. decolorata* together. I took *E. alcetas* alone at Varnik and Slivnitza, *E. argiades* and *E. alcetas* at Lulin, and *E. argiades* at Kostenetz-Banya.

Finally, let me say a word of Kostenetz-Banya. My collecting ground here was a narrow valley, with precipitous overgrown sides, down which poured a cold torrent, while above towered the wooded steepes that surmount this lovely glen. I did not get a second chance of visiting this lovely place; I do not think I went more than two miles up the track beside the stream, but I may be excused, for I never saw a more varied butterfly fauna. The glen is 3,000 ft. above sea-level, at most, at its entrance, but it runs up many miles into the mountains and is the best approach to Mt. Belmeken, where *Erebia melas* subsp. *acoris*, Fruhst., *E. rhodopensis*, and other good things occur. I saw 40 species of Rhopalocera and Gypocera that morning, and can say with conviction that even the glorious Rohrwald, near Vienna, where I chased *Apaturas* by the score, and took *Melitaea maturna*, worn, but still attractive, on June 30th last, was less enticing.

Other localities were not so good as Lulin and Kostenetz-Banya, where numbers were joined to variety, but Sary-Gyol on fine days is an excellent place for mountain butterflies, and in every other locality visited it was possible to get good series of several species. There were some rarities or absences that I found strange; thus I did not see a single *Hipparchia semele*, which is very common at Constantinople; I only saw three *Pararge aegeria* and only one *Vanessa io* in my two visits. Of the Zygaenids, a race of *Zygaena carniolica*, was abundant at Lulin, but everywhere else, from what I could see, one would do very well to get a couple of dozen specimens in a day. The Melitaeas seemed generally to be, or have been, common where they occurred. Argynnis only became features of the butterfly fauna above 3,000 feet. At low or moderate elevations in 1927 (1,800 ft.-3,000 ft.) *Leptosia sinapis*, *Epinephele jurtina*, *Melanargia galathea*, *P. argus*, *P. icarus*, *H. dorilis* and *Colias croceus* were the most widespread and frequent insects, and after these, *Coenonympha arcania*, and *Melitaea didyma*. In the mountains (3,000 ft.-4,500 ft.) I found *M. athalia* subsp. *borisi*, Fruhst., *H. virgaureae*, *M. galathea*, *E. ligea*, *E. euryale* subsp. *syrmia*, generally frequent in 1927, while in 1925 worn 1st brood *L. sinapis*, *H. hippothoe* subsp. *leonhardi* and *Aporia crataegi* (worn) were equally frequent, and *M. galathea* was only just coming out.

In the following remarks as to the species obtained or observed, exactly 100 in 1927 and 102 counting captures made in 1925 and not repeated later, I have refrained from giving subspecific names to the majority of my captures for the following reasons:—

(1) I have not seen Fruhstorfer's types of several sketchily described and unfigured Bulgarian subspecies.

(2) My material is often insufficient.

(3) There is considerable physical and climatic variety in the Bulgarian kingdom. The Rilo-Rhodope chain especially on the Northern slope has a copious rainfall and a changeable climate by comparison with the Eastern Rumelian area, about Slivno, which appears to be altogether more 'Pontic.' Vitosh lacks some of the mountain species of the Rilo-Rhodope. The butterfly fauna of the Stara-Planina (the true Balkan range) differs from that of the Rilo-Rhodope including *inter alia* a subspecies yet undescribed of *Erebia ceto* with *B. amathusia*. The Pirin in some cases seems to produce somewhat different forms from other mountains, while the coast of the Black Sea (Burgas) has revealed the existence in Bulgaria of *Hesperia tessellum* and *Coenonympha oedippus*. A survey of the fine collection in the Royal Museum at Sofia suggests that the Bulgarian butterfly fauna is as diverse as the configuration and climate of the country and thus, to give an example, though I have *Melanargia galathea* from the Sofia district and Chamkurya I do not feel justified in assuming that it is *M. galathea* subsp. *satnia*, Fruhst., described from 'Maglitch' in the Main Balkan.

(To be continued.)

The British Species of the Chalcidid Genus *Harmolita* (Hymenoptera) as indicated by their Galls.

By RICHARD S. BAGNALL, F.R.S.E., F.L.S., and
J. W. HESLOP HARRISON, D.Sc., F.R.S.

Although the galls produced by members of the genus *Harmolita* (*Isosoma*) upon various grasses are often encountered in this country, but little time has been devoted to their study and our knowledge of their distribution and occurrence is consequently of the slightest. On the other hand, no plants are more difficult to work for galls of any sort than the grasses and sedges; results can only be obtained by close and constant search to the exclusion of all other interests, and the published results, however successful, can never convey the long and laborious nature of the investigations they represent.

In preparing a Text-book of British Cecidology for publication in the near future, we have been struck by our lack of knowledge of certain minor groups of gall-causers such as this, and we therefore propose to publish a series of short papers embodying the results of our researches in such restricted groups from time to time.

We believe that it will be found that all true members of the genus *Harmolita* are limited to species of the great family of grasses, and, bearing this in mind, it will be necessary to re-examine Westwood's *Isosoma orchidearum*, with a view of establishing its true generic position.

In the following list an asterisk denotes species new to Swanton's list (1912) and for the most part new to the British Fauna, of which, however, the galls of *Harmolita graminicola* were known to and described by the late Professor J. W. H. Trail, F.R.S.,* from both *Agropyrum junceum* and *A. repens*, whilst the "*Aulax hieracii*" from Couch Grass may prove to be referable to *Harmolita agropyri*.

The initial 'H' refers to Houard's Monograph of the European Zooecidia.

Harmolita hyalipenne, Walk. H. 211.—This species causes the well-known gall on the Sea Mat Grass (*Ammophila arenaria*) and is common along our shores.

**Harmolita airae*, Schl. H. 219.—On *Aira caespitosa* causing a scarcely perceptible stem swelling near a basal node and difficult to detect. Several Northumberland and Durham records and probably of wide distribution. Originally described from Germany.

**Harmolita poae*, Schl. H. 262.—On the Wood Meadow-Grass (*Poa nemoralis*) causing a glossy longitudinally striate fusiform stem swelling, which is yellowish at first and contains an orange-red larva. Isolated records from Northumberland and Durham. A very distinct gall but rare. Described from Germany and later recorded by Corti from Italy.

Harmolita depressum, Walk. H. 282.—Causing a well-known and common stem gall on the Sheep's Fescue grass (*Festuca ovina*) in the shape of an irregular yellowish to greenish yellow swelling, which is generally situated near the first or second node.

**Harmolita hieronymi*, Schl.—This species causes a strong regularly

fusiform stem swelling in *Festuca* spp. of about 10 mm. in length and 5 to 6 mm. in diameter, and is recorded from *F. glauca* (H. 278), *F. ovina* (H. 6316), and with little doubt from *F. sciuroides* (H. 6317). It would seem to be a not uncommon species and we have seen it on *F. rubra*, *F. ovina* and *F. duriuscula* in the North of England.

**Harmolita giraudi*, Schl. H. 274.—Causing a very faint swelling near the second or third node in the Giant Fescue (*Festuca gigantea*) and very difficult to detect. Seen on two occasions in the Gibside woods, Co. Durham, July-August, 1923. Originally described from Germany.

**Harmolita graminicola* (Gir.). H. 308, 312, 6322.—A fusiform, or cigar-shaped, gall caused by the terminal internodes remaining short and the consequent bunching together of the imbricated leaves, which would appear to be hypertrophied, shortened or thickened to a greater or less degree according to the grass itself. It is common on *Agropyrum junceum* and *A. repens*, from which plants it was well-known to Trail, and we have observed what is almost certainly the same species on *A. acutum*, and *Lolium perenne*.

**Harmolita agropyri*, (Schl.) H. 316.—A globular or fusiform hard plurilocular gall situated near the spike which (according to Houard) is generally more or less deformed and remains enclosed in the sheath of the terminal leaf. We have only seen this gall on two occasions at Formby (Lancashire), September 11th, 1923, and Bomere Heath, near Shrewsbury, October, 1923, and believe that the species recorded by Cameron, Connold, etc., as *Aular* (*Aulacidea*) *hieracii* from stem of Couch grass is this species.

**Harmolita brischkei*, Schl. H. 351.—A slight and not readily perceptible stem swelling caused by a small Hymenopterous larva in the stem of *Elymus arenarius*, is referable to this species originally described by von Schlechtendal from Germany. A few examples from the Teesmouth, Redcar (Yorks.), and Seaton Carew (Durham).

We have also noted several other Grass galls caused by species of *Harmolita*, of which the following appear to be important:

Harmolita sp.—On *Aira* (*Deschampsia*) *flexuosa*, L. Strong swelling in stem, often high up, either broadly fusiform or bellied.

Harmolita sp. On *Glycera maritima*, L.—Irregular swelling well up in the stem: larva white. On the coasts of Northumberland, Durham and Yorkshire.

Harmolita sp.—On *Festuca rubra*, L. Scarcely perceptible swelling of the stem: larva white. Penshaw and Birtley (Co. Durham).

Harmolita sp. ? H. 276.—On *Festuca rubra*, L. Irregular swellings of the stem situated near the second or third node, often 30-40 mm. long and sometimes causing considerable torsion; larvae yellowish. Records from Northumberland, Durham and Yorkshire.

Harmolita sp. ? H. 321.—On *Agropyrum repens*, Palisot. A scarcely perceptible stem swelling.

Harmolita sp. H. 194.—On *Agrostis canina*, L. Recorded by Trail, and also occurs in N. Durham.

Birds as enemies of mining larvae in South Hampshire.

By Wm. FASSNIDGE, M.A., F.E.S.

No one who has searched in the spring for the larvae or pupae of those insects that mine in stems, twigs, and stumps can fail to have noticed plain signs of the ravages of birds among these species: but it is only after more systematic observation that these ravages are appreciated to their full extent. These notes make no claim to completeness, but aim at giving some account of the activities of birds during the winter among certain larvae—chiefly Aegeriid larvae—in the district around Southampton.

Perhaps our commonest Aegeriid is *Synanthedon culiciformis*, L., which abounds in every copse where birch is more or less regularly cut. By November the full-fed larvae are resting in their cocoons, which are rarely found very deep in the wood of the stump, and frequently between the bark and the wood. The exit hole is often sealed with a silken cap which is not difficult to detect when it is placed on the flat cut surface of the stump. Frass in plenty, extruded chiefly between the bark and the wood, betrays the stump that contains larvae. By January the stumps are nearly one year old and are beginning to get rotten, so that birds have no great difficulty in pecking the stump almost to pieces and extracting a large percentage of the larvae, especially those that are not very deep in the wood. I am still unable to name the bird responsible for these attacks, but it is not rare to surprise the large green woodpecker hunting on the ground among the birch stumps in the wood, so that very likely he is the culprit, or one of them. It would not be surprising either, to learn that pheasants sometimes pecked out these decaying stumps, but so far all attempts to catch the spoiler in the act have met with no success.

Another Aegeriid, one that occurs probably in all our alder swamps, and certainly in at least half a dozen localities in this neighbourhood, is *Synanthedon spheciformis*, S. & D. Like all the species of this group, it seems to have years of maximum abundance followed by years when it almost disappears. In 1923 it reached the highest point of its curve since I have lived in this district, and in some of the alder bottoms large numbers of young stems contained a larva or two, and sometimes as many as six borings occurred in stems of less than two inches in diameter. Several entomological friends were anxious to take this species and were duly informed that larvae could be had in plenty, but all save one chose to wait until May before coming to cut out the stems. As I had already taken a good series on the wing and bred a fair number, I reserved the best locality, where in the spring of 1922 I had noted the frass of large numbers of first year larvae not only at the roots of young alders but also in two cases at the roots of young birches. When on April 8th the first visit of the season was made to this alder swamp, it was found that practically every stem had been attacked by birds with one of two results; either a ragged hole showed where the bird had pierced to the mine and extracted the larva, or else a clean-cut exit hole showed the end of the mine, and in all these latter cases the larva was gone, as was proved by repeated experiment. With much searching, a dozen or more larvae were found, but many hundreds had been destroyed. The bird responsible is most probably a woodpecker, for it must possess a long tongue which it can insert in the boring in order to extract the larva. In other

localities also traces of the attacks of birds were commonly seen, and such attacks had not always been successful, for on Feb. 22nd I found a stem, which showed where a bird had made two attempts three inches apart, and had pierced to the mine twice without succeeding in extracting the larva. It is difficult to say how the bird discovers a tenanted stem in the case of this species. The frass ejected is nearly always hidden by moss or grass growing round the roots, and the position of the exit hole is only rarely to be distinguished even by the closest search. As proof that the bird has trouble in finding the end of the mine, which is covered by thin bark, may be cited the fact that in all cases where the exit hole has been laid bare, a number of beak marks varying up to thirty or even more can be counted on the stem. Judging by the appearance of the pecked-open mines, the task must often have taken several hours at least, for the mine is nearly always in a living stem; only very rarely does the stem die before the insect emerges, though it frequently dies afterwards.

Another Aegeriid which is widely distributed in Hampshire though not abundant is *Synanthedon andrenaeformis*, Lasp. I have often noted pecked-open mines of this species in Buckinghamshire, where it is much more common, but it was at Shawford near Winchester, a locality where a friend and myself once found more than forty capped mines in a single morning, that the attacks of birds were first noted as a serious menace to this species. One bush of *Viburnum lantana* was seen on which were twelve pecked-out mines and not a single good one. The same two methods are adopted by the bird as in the case of *S. spheciiformis*; either the twig is ripped open or the cap torn off, leaving the exit hole gaping. In the first case, which is by far the more usual, the mine is always empty, but in the second case it is not invariably so, and it may be that sometimes the cap is removed by some other agency, for it is not very firmly fastened as a rule. It should be noted that beak marks are usually numerous in both cases, which would seem to prove that the bird does not hunt by sight alone, for the cap is plainly visible. Usually only the mines in fairly thin young shoots are attacked. Probably the bird mainly responsible is some species of tit, which is unable to penetrate the hard wood of older stems.

Every red currant bush of any age in every garden in Southampton probably contains each winter the larvae of *Synanthedon tipuliformis*, Clerck. There are two ancient bushes in my garden from which every year in December I can cut a dozen or more mines, but if the search is left until later in the winter, it is found, as in January, 1925, that these mines have been ripped open for a distance of from two to four inches, nearly the whole length of the mine, and that the larvae are gone. Though I have not yet witnessed the act, it is almost certain that blue tits are the culprits, for they are very common here and are frequently seen in the fruit trees and bushes. Mines in soft wood of the season's growth are attacked, and those in harder old wood are left untouched. The mine is probably discovered by the frass extruded.

Synanthedon formicaeformis, Esp., occurs on Baddesley Common near Southampton and at New Milton and Christchurch in the south of the county. In the first locality it mines in large stems up to several inches in diameter, and is much attacked by birds which peck out large holes in their efforts to reach the larvae; at New Milton it forms galls on smaller stems and is also very frequently pecked out by

birds. In both cases frass is visible in greater or less quantity and the gall in the second case also betrays the presence of larvae. The marks made by the bird's beak can be counted on the stem, showing how the bird sought for the best place to begin operations. In December, 1926, large numbers of pecked-out mines were found at New Milton, and not a single mine in a moderately thin twig was found intact. The mines in thicker stems are also often attacked and the gall is pecked to pieces or a hole made immediately above it. One such mine in a stem of half an inch in diameter shows more than thirty testing beak marks, and the hole made is 25mm. long and 7mm. wide. The mines situated high up on the willows suffered most, while those quite close to the ground and hidden by long grass and sedge were intact.

The newly discovered British Aegeriid, *Synanthedon flaviventris*, Stgr., suffers perhaps worst of all from the attacks of birds. As nearly every mine is in two year old willow shoots, and always situated much too high to be hidden by any undergrowth, there is no protection of any kind, while the large number of galls of different species commonly found on willow only serves to encourage birds in their patient search. Already in the winter of 1925-6 I noted a number of mines ripped open, and in 1926-7 I found a larger number of old mines of the previous year that had been pecked open by the birds. But in the winter of 1927-8, when mines of this species were first found in any number, I realised what a high percentage of the larvae perish in this way, for by the end of October mines in very thin stems were found pecked open, and by December the number of mines destroyed had increased very considerably. It is certain that by April, especially if a spell of frosty weather comes, nearly every mine will have been investigated, and only those overlooked by the birds will remain to reward the patient entomologist. Almost certainly these mines are found by sight, for no frass is visible, and the gall is no more difficult to see than that made by the various species of gallflies on willows, which are also readily discovered and pecked open by birds. The birds noted as often seen searching among the willow bushes are the different species of tits, especially the coal tit and the marsh tit, but positive evidence is so far lacking.

Another species of lepidoptera that forms a gall in shoots of willow, this time in one year old shoots, and that suffers very severely from the depredations of birds, is *Grapholita servillana*, Dup. The insect is comparatively abundant in this locality, but it is nearly a hopeless task to search for mines later than January, and even in November at least 50% of the mines found will be those that have been recently pecked open, though it must not be forgotten that these damaged mines are very much more readily seen than are good ones. The curious oval flattened malformation, so often seen on willow shoots, appears to be the plant's attempt to heal the wound made by the bird as it pecks out the mine of this species. Probably the coal tit is again the culprit, or one of them. Many times I have watched him questing through the willows, and disturbed him from among them. Often a pair have protested excitedly against my invasion of their hunting grounds, but so far my patience has not been rewarded with a sight of the ravager at work.

It is difficult to give a reason why *Synanthedon vespiformis*, L., should be entirely free from these attacks, yet this seems to be the case. The insect is very common in this district, and yet no

single instance of any attack on its larva by birds has so far been noted, though plenty of frass betrays its whereabouts. Two possible reasons are suggested: it may be that the oak stump offers too great a resistance, for the bark can only be prised away, and the larva exposed, by the exercise of considerable force; or it may be that the larva is generally too small in the winter to be worth bothering about from a bird's point of view, for we collectors do not take these larvae before May, and even then we find many of them not yet full fed. Whatever may be the reason, this species, so far as I know, is immune from the attacks of birds.

The only other stem feeding Aegeriid found here is *Sphecia crabroniformis*, Lewin, which is not uncommon in old sallows of considerable growth. Only very rarely have I noted any attempt to peck out this larva, which feeds too deeply in the wood and too low down in the stem and roots to be vulnerable. It comes near the bark of the stem only just before pupation in June or later, and at that season the birds are not hard pressed by hunger as they are in the depths of winter.

A number of coleopterous larvae feed in stems and are more or less subject to the attacks of birds. The most conspicuous example in this district is *Saperda populnea*, L., which makes galls in small stems and branches of aspen and willow. The swelling is easy to see and few pecks are needed to show the exact position of the larva. Aspen is not a hard wood and the labour involved in extracting the larva is not very great, so that large numbers of these larvae are destroyed. Of the coleopterous larvae, which feed in dead and decaying branches of trees, for example *Mesosa nebulosa*, Fb. (*nubila*, Oliv.) and *Strangalia maculata*, Poda, (*armata*, Herbst,) large numbers are extracted by birds, their chief enemies being probably woodpeckers.

Unerring skill is displayed by the birds in their search for a tenanted mine. One often finds mines of one or another species of Aegeriid, which appear to be good, but which have been examined by birds, as the marks of their beaks on the stem plainly testify. Yet the birds have not pecked these mines open, and it is usually found on examination that such mines no longer contain a living larva. The degree of persistence displayed by the birds undoubtedly depends very largely on the severity, or otherwise, of the weather during the winter months, and on the consequent scarcity or abundance of other kinds of food. It would probably be admitted even by the most sentimental of bird-lovers that tits have increased beyond all reasonable proportion in Hampshire since the last severe winter in 1916-17, due to the constant war waged by the gamekeeper on their natural enemies. Those who make a practice during severe weather of providing some food for them in the shape of coconuts, suet and sunflower heads might reasonably be expected to provide for all their wants during the winter, so that the whole burden of feeding them and not merely a very casual part of it falls upon the shoulders of those who take such pleasure in it. Every tit in the neighbourhood would be a regular visitor and would not then spend much time and labour in pecking out larvae from stems and twigs, so that our native Aegeriids would perhaps suffer less from this disturbance of nature's balance. Finally, I should be very interested to know if the experience of others is the same as mine, and to learn any further details observed concerning the ravages of birds on the larvae of the species mentioned and on other similar species.

The Tentamen of Jacob Hübner.

By W. H. T. TAMS, F.E.S.

All that has been written about Hübner's *Tentamen*, culminating in the recent decision of the International Commission on Zoological Nomenclature against acceptance of the work, should have left little more to be said. However, since Mr. W. T. M. Forbes, Dr. Holland, and recently Mr. H. J. Turner (in this Magazine), have found it necessary to continue the discussion of this work, perhaps I may be permitted to indicate that I do not concur in the views expressed by Mr. Forbes and Mr. Turner.

It has been said that the true generic names in Hübner's *Verzeichniss bekannter Schmettlinge* are the names of the Stirpes. If this view were accepted, it would definitely conflict with the consistent acceptance of the Linnean principle of binominal nomenclature. It seems clear to me that, although Hübner appears to have understood fairly well the system of Linnaeus, he was dissatisfied with the application of the terms, and he says that he has found it necessary to introduce additional terms. In the preface to the Second Century of the *Zuträge* of his *Sammlung exotische Schmettlinge* Hübner says: "Die Worte *Classis*, *Ordo*, *Phalanx*, *Genus*, *Familia* und *Species* haben sehr unterschiedliche Bedeutungen erlangt, die theils wider den Sachbegriff, theils auch wider die Stufenfolg und theils wider den Sprachgebrauch streiten," which I take to mean: "The words *Classis*, *Ordo*, *Phalanx*, *Genus*, *Familia* and *Species* have attained very different significations, partly against the real conception, partly contrary to the proper sequence, and partly contrary to the accepted usage." I do not think *Familia* is a Linnean term. In introducing the new terms *Familia* and *Coitus*, Hübner unfortunately displaced one of the most important of the Linnean terms, *Genus*, misusing it only in the Linnean sense. But Hübner adhered to the binominal principle, and in my opinion we must accept as generic names, those names associated by Hübner directly with the *trivial* names. I should like to point out that some difficulty has been experienced in assigning a proper value to the Linnean names *Bombyx*, *Noctua*, etc., in consequence of which the true generic name *Phalaena* has only recently been definitely accepted as such. This difficulty should not have arisen for two reasons. Linnaeus (*Syst. Nat.* ed. 10, 496, 1758) in a footnote says: "*Phalaenae dividendae, quo facilius inquirantur*," a statement to which attention has been drawn before. But I do not think attention has ever been drawn to the latter part of the following Linnean classification of the Linnean terms. It has been pointed out that at the end of Tom. I., Pars. II. of the *Systema Naturae*, ed. 12, there are two indices, the *Nomina Generica* and the *Nomina Specierum propria* or *Nomina Trivialia*. But there is another index, headed *Termini Artis*, which I take to mean Scientific Terms, and under this we find the names *Bombyces*, *Noctuae*, etc., and in addition such terms as *Orum*, *Classis*, *Insecta*, *Lepidoptera*, *Authores entomologi*, etc. I begin to wonder if I have translated *Termini Artis* correctly. However, I think this index clearly shows that Linnaeus did not include the names *Bombyx*, *Noctua*, etc., in his system of binominal nomenclature. Similarly

Hübner, in departing from the Linnean application of terms, and in introducing new ones, still adhered to the Linnean binominal nomenclature, and there is in my opinion no question as to which of Hübner's *Verzeichniss* names we should accept as generic.

To return to the *Tentamen*. In compiling his *Verzeichniss bekannter Schmettlinge* Hübner had occasion to change some of the names of the Stirpes he used in the *Tentamen*, and in a few cases to slightly modify his classification.

Of 107 names of Stirpes in the *Tentamen*, Hübner employs in the *Verzeichniss* with the same application 95, of which 10 are modified in spelling (including *Hyphanta* changed to *Coenyphanta*). In addition, he employs *Glaucopis*, *Sphecomorpha*, *Hipocrita* and *Salia* with a different application, their exponents being placed elsewhere. Of the remaining 8 names, 7, viz., *Rustici*, *Principes*, *Mancipia*, *Consules*, *Urbani*, *Amorphae*, and *Pyrophyllae*, are not used at all in the *Verzeichniss*. Finally, we have a solitary name, *Thyris*, used for a Stirps in the *Tentamen*, and for a Coitus in the *Verzeichniss*.

I have compiled, as far as I was able, a new *Tentamen* for that portion of the *Verzeichniss* (viz., Phalanx II. *Sphinges*) which contains the Coitus *Thyris*.

PHALANX II. Sphinges.

TRIBUS I. Papilionides* (sic).

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|------|-----------------------|--|
| I. | <i>Zygaenae.</i> | <i>Thermophila filipendulae.</i> |
| II. | <i>Chrysaores.</i> | <i>Procris statices.</i> |
| III. | <i>Glaucopes.</i> | (Exponent placed in previous Stirps:
<i>Chrysaores</i>). |
| IV. | <i>Sphecomorphae.</i> | (Exponent placed in different Stirps:
<i>Glaucopes</i>). |

TRIBUS II. Hymenopteroides.

- | | | |
|-----|---|---|
| I. | <i>Sesiae.</i> | <i>Conopia myopaeformis.</i>
(<i>Sesia culiciformis</i> of <i>Tentamen</i>). |
| II. | <i>Apyralides.</i>
(<i>Thyrides</i> of <i>Tentamen</i>). | <i>Thyris fenestrina.</i>
(<i>Thyris pyralidiformis</i> of <i>Tentamen</i>). |

TRIBUS III. Legitimae.

- | | | |
|------|---------------------|-------------------------------|
| I. | <i>Bombyliae.</i> | <i>Psithyros stellatarum.</i> |
| II. | <i>Eumorphae.</i> | <i>Oreus elpenor.</i> |
| III. | <i>Deilephilaе.</i> | (A new Stirps). |
| IV. | <i>Manducae.</i> | <i>Acherontia atropos.</i> |
| V. | <i>Smerinthi.</i> | <i>Polyptychus populi.</i> |

Hübner was evidently dissatisfied with the association of the *Sphecomorphae* with the *Sesiae* and *Thyrides* in his Tribus II. (*Hymen-*

*In the *Tentamen* it is *Papilionoides*. Durrant in his comparison of the *Tentamen* and *Verzeichniss* erred in quoting it as *Papilionides*.—H.J.T.

opteroides), and apparently recognising their close relationship with most of the moths in his Stirps III. (*Glaucoptes*), he transferred them to Tribus I. (*Papilionides*) as an additional stirps (Stirps IV.). This was a good piece of work, but then he got into trouble. He had left in Tribus II. two stirpes, the *Sesiae* and the *Thyrides*. With the former Hübner apparently had no difficulty, but somehow he got two *Pyralides* associated with his *Thyrides*, saw their resemblance to *Pyralides*, but was evidently led astray by the hyaline spots, and decided that they were related to the transparent-spotted *Thyrides*. His names and definitions convey very clearly to me the working of his mind. He was then faced with the choice of names, and having been impressed with the resemblance of the three species to *Pyralides*, he finally decided that as, in his opinion, they were not *Pyralides*, he would name his Stirps II. *Apyalides*, and retain the name *Thyris* for his Coitus 1.

I have analysed this portion of the two works on account of the controversy in connection with the validity of the *Tentamen* names. I have never myself had any doubt as to the nature of the names since I understood the title of the *Tentamen*, and its reference to "stirpium Lepidopterorum." I might not have arrived at this conclusion so readily had I not the assistance of Hübner's detailed explanation of his terms in the *Anzeiger* to the *Verzeichniss*. If it should be argued that a contemporary of Hübner's would be in just that case, not having the *Verzeichniss*, I would point out that Hübner showed that he was familiar with Linnaeus's system and was obviously dissatisfied with it, and chose definitely to draw up a new scheme, utilising the Linnean names and terms as he thought fit. It is clear that he was of the opinion that Linnaeus was dealing with far too unwieldy groups, and therefore utilised the Linnean generic and "subgeneric" names for his own Phalanges, subdividing them to suit his own scheme. It is evident, too, that he adapted the term "genera" to his own scheme of terms, applying it in one of the more literal senses, to the *nomina trivialia* of Linnaeus. One cannot be certain that a student examining the *Tentamen* for the first time would not interpret the names therein as "nomina generica" associated with "nomina trivialia," but, in view of his probable knowledge of Latin, I think he would have an even clearer idea of the meaning of the title of the *Tentamen* than we have when first we try to translate it.

No one would be better pleased than myself to be able to accept the *Tentamen*, as it would solve easily a number of problems in our nomenclature, but I cannot honestly accept it, and I am compelled to agree with Dr. Holland's arguments having long ago come to the same conclusions myself in spite of many attempts, on part of those who were anxious to preserve the names, to shake my conviction.

And, finally, the International Commission on Zoological Nomenclature has ruled, not without thorough investigation and lengthy consideration, that the *Tentamen* shall not be accepted. Progress towards stability in nomenclature is so terribly slow that we can ill afford to throw away a single opportunity of making a forward step, and I would urge that we abide by the decision of the only body that can give us an authoritative ruling.

The Seasonal Variation of *Spilothyrus (Carcharodus) orientalis*, Rev.

By P. P. GRAVES, F.E.S.

Spilothyrus orientalis was described from specimens taken in June in the Peloponnese, probably at Kalavryta or on Mt. Chelmos by Neuschild. These were certainly of the 1st. Gen. Specimens from Parnassus in the B.M. agree with these generally as do mine from Constantinople (Europe and Asia), which Dr. Reverdin identified (in litt.) with *orientalis*. Others from Athens (April) agree with these. A 11nd. Gen. occurs at Constantinople between the end of July and early September. I feel justified in naming it as a precaution against the discovery of a 'new race' of *S. marrubii (baeticus)*, Rbr., which it resembles. I have not yet seen any certain evidence of the occurrence of the latter species in the Balkans, though that is by no means improbable. *S. orientalis* occurs in Europe in the Constantinople District, Gallipoli, Greek Macedonia, on Mt. Parnassus (all in B.M. Coll.), at Athens and in the Peloponnese.

Spilothyrus orientalis, Rev., Gen. II. **aestatis**.

Of much smaller size on the average than Gen. I. and with more acuminate wings in the majority of ♂♂. The length of the forewing exceeds 13.5mm. in only 3 ♂♂ and 2 ♀♀ of a series of 20 ♂♂ and 5 ♀♀ of this Gen. from Constantinople. In a large majority it does not exceed 12.5mm. in length, whereas in only one specimen of the 1st. Gen. out of 33 examined is it less than 13.5mm., and in the majority it ranges from 14mm. to 15mm. The ground colour is somewhat lighter as a rule and the diaphanous spots of the forewings less noticeable, but the main difference is in the underside. That of the forewings is darker than in Gen. I. and the pale scaling of the costal margin is much reduced, sometimes almost absent. The underside of the hindwings is rightly described by Reverdin (*Bull. Soc. Lep. Gen. II.*, p. 232) as cloudy in appearance, the white areas being indefinitely outlined and 'comme laves' (loc. cit.). In *aestatis* the white area is more restricted. The dark pattern composed of spots of a warmer more olive-grey or yellowish-grey colour than in Gen. I. is more extensive and regular almost covering the wing in two aberrant specimens and the spots are better defined and more rectangular in shape, in fact distinctly approaching those of *S. marrubii (baeticus)*.

Holotype, ♂ Chamlija, Constantinople, Asia. July 24th, 1921, P. P. Graves.

Paratype, ♀ Gyok Su, Constantinople, Asia. August 19th, 1911, P. P. Graves.

B.M. Type Nos. Rh. 315, 316.

NOTES ON COLLECTING, etc.

A NOTE ON BOLOCERA (LUDIA) SMILAX, WESTW. (SATURNIIDAE).—A few days after Christmas three larvae of a species of *Saturniidae*, feeding upon the foliage of a Pepper Tree, were brought to me by some small boys. I placed the larvae in a cage on the verandah of my house and in ten days' time they had all pupated. Thinking that the adults would not emerge before the spring I paid no further attention to the cage in question.

In a few days, towards the end of February, freshly emerged adult males of a species of *Saturniidae* were very common at the dining room light in the evenings. I did not observe these moths at street lights or in other houses. About two days after the first appearance of the moths I happened to glance into the cage on the verandah and found to my surprise what appeared to be a female of the species seen at light. That night I observed the males coming to the cage, flying around and alighting on it. When the dining room light was turned on (the cage was quite outside), the males were attracted indoors by it. After the death of the female no more males were seen. A fortnight later, when another female emerged, the males appeared as before. This time the cage was inside the house.

The following are some brief descriptive notes:—

Egg.—The egg is oval, almost round in shape, the length being 2mm. and the width about 1.75mm. The colour is white, and to the naked eye seems smooth, but under a lens is seen to be finely reticulated.

Larvae.—When full grown, the larva is some 3 inches in length. It is blackish in colour, with a series of pale yellow transverse bars along its length.

Pupa.—The pupa is of a dull brownish black in colour, and that of the female is $1\frac{1}{4}$ inches in length. Pupation takes place in a rough cocoon, either on the surface of, or in the soil.

Food Plant.—*Schinus molle* (Pepper Tree). This tree is an introduced species and is grown for shade and ornamental purposes. Its roots appear to take all the good out of the soil as other plants will not do well in its vicinity. When in flower the tree gives many people a form of hay fever.

I am indebted to Mr. Hy. J. Turner for determining the Saturniid.—J. SNEYD TAYLOR, B.Sc., Barberton, Eastern Transvaal.

[Lt.-Col. J. M. Fawcett gave figures of the larva and cocoon of this species in *Trans. Zool. Soc. Lond.* vol. xv. 305. pl. 49. f. 6 & 7 (1901) and a figure of another larva, *l.c.* vol. xvii. 171. pl. 6. f. 35 (1903). He states that the larva is extremely variable in the intensity of its colour and in the development of the tufts of hair arising from the tubercles although the scheme of pattern is the same in all. He also adds that "through a microscope it looks like a piece of old china ware in colour" and "is one of the most unpleasant larvae to handle that I have ever met with. The short black hairs on each somite possess poisonous qualities, which produce on the hand a white rash akin to that produced by a bad stinging from nettles."—Hy. J. T.]

CURRENT NOTES AND SHORT NOTICES.

A further contribution to the knowledge of the Lepidoptera of China has been published by Prince Aristide Caradja in the *Mem. Acad. Romana* in Bucharest. It contains an account of much of the Microlepidoptera collected by M. Stötzner in the years 1914-1919, together with that in the collections of M.M. G. M. Franck and S. M. Thomson. The main portions dealt with were obtained in the mountains near Peking, and in the Szetschwan province. Some of the new species were described by Messrs. Tams and Meyrick. There is an

interesting introduction on the distribution of the species especially of the *Pyralidae*.

May we ask our readers to send us records from out-of-the-way places. There are many areas from which nothing is known as to the insect fauna, and our readers are scattered all over the British Islands. A large number of the old records are from the same localities year after year, *e.g.*, New Forest, Deal, Folkestone, W. Wickham (now only a dream), Box Hill, etc., etc., and many of these records are from town dwellers, whose visits are short and limited in various ways. Who sugars now? There have been but few records of late. Who works the light? We published a considerable and interesting list a while ago, but that stands alone. Does anyone go north now? The Shetlands produced wonderful results yaers ago. Can the same show be made now? or are conditions altered since?

REVIEWS AND NOTICES OF BOOKS.

"Die Lepidopterenfauna von Albarracin in Aragonien" is the title of a paper published in the November-December nos. of *Eos*, the Spanish Journal of Entomology. The author is Dr. H. Zerny of the Hofmuseum, Vienna. As a separate it is a volume of 190 pp. large octavo and 2 pls. It is a fine example in style and thoroughness for which the staff of the Vienna Museum are famous. The origin of this local fauna arose from the author's summer holiday in the period June-July, 1924, supplemented by a more or less intensive collecting, especially at light, by other Vienna entomologists in 1925-6 at other periods of the year. It is noted that many entomologists have visited the district, especially Englishmen, but mostly for *Rhopalocera* only. The author has collected information from all previously published accounts, some 27 in number, in addition to those of the above mentioned collectors. Over 1100 species are dealt with and included are page references to each of the authors of previous papers. Dr. Zerny has, quite independently, seen the point in nomenclature to which we referred a while ago, that the specific name put, such as *podalirius feisthameli*, Dup., is not really correct, but should be *podalirius*, L., *feisthameli*, Dup., or *podalirius* (L.), *feisthameli*, Dup. In the main the order and names of the Staudinger *Cat. Illud.* is followed, but in all cases the more modern genera and subgenera, into which the omnibus genera of Staudinger had to be broken, are added in brackets. The Geometers, Tortrices and Micros are excepted. In the first Seitz' (*i.e.*, Prout's) arrangement and names are used except that subgenera are often omitted (*e.g.*, in *Idaria*). In the Tortrices the order and genera of Kennell are used, and in the Micros Meyrick's nomenclature and arrangement. Attention is especially called to subspecies, races and forms. Sagarra has named the *Sloperia proto* of Albarracin as subsp. *aragonensis*, differentiating it as wanting the golden yellow on the upperside of the forewings, but all Dr. Zerny's specimens possess this character more or less distinctly. Thus *aragonensis* is not a subspecies in the full meaning, but what we call a race, *i.e.*, possibly a subspecies in the making. Similarly he finds no difference between the so-called *fonti* form of *Coenonympa dorus* and the *C. dorus* taken along the French Mediterranean area, agreeing fully with M. Oberthür's judgment previously. And so on, carefully comparing the

status of previously described forms with the specimens which have passed through his hands. He met with the hitherto very rare Liparid, *Albarracina korbi*, in some numbers at light and also found the larvae. The opportunity is taken to give a resumé of the genus and its three species, pointing out that Seitz' figure represents a Psychid, *Steropteryx hirsutella*, and that Spuler's figure is also in error as well as the foodplant he gives. It is a pity that such excellent work should be marred by a few, we presume, editorial slips, such as *Zerythia* (*Zerynthia*), *Crysophanus*, *Mametra*, etc. Surely *egeria* should be *aegeria*, *megeera*—*megeira*, *corydon*—*coridon*, *latonia*—*lathonia*, etc. For easy recognition one would like to see the more recently corrected names with those they have replaced in all cases, e.g., *sertorius*, Hfsg. (*sao*, Hb.). It is a pity that the two plates are not up to modern requirements, a great contrast to the letterpress which they are supposed to illustrate. Still, all these minor defects in no way detract from the value of the paper, and we must heartily congratulate Dr. Zerny who has followed quite successfully in the footsteps of his illustrious chief, Dr. Rebel.—HY. J. T.

OBITUARY.

Edward B. Nevinson was born at Leicester in 1858 and early in life he developed an enthusiasm for natural history, and accumulated a vast store of knowledge in many of its branches. With his brother, he made important collections illustrating British Ornithology, Conchology and Entomology; he also made a good collection of Crustacea, and became a fellow of the Zoological Society in 1895.

But Entomology was his favourite study. At first he confined his attention to the *Lepidoptera*, of which his collection is a good one. Later he turned his attention to the *Coleoptera*, the *Neuroptera* and the *Hymenoptera*—particularly the *Aculeata*. In 1901 he joined the Entomological Society, and became intimate with the late Edward Saunders, F.R.S., F. D. Morice and F. W. L. Sladen; more recently he corresponded regularly with Dr. Perkins, Mr. A. H. Hamm, and Mr. O. W. Richards, affording to all six help in their several researches and publications.

Unlike most Hymenopterists, Nevinson always set his specimens; and when he showed his collection at the Entomological exhibition held at Burlington House in 1912, it was the subject of much comment and admiration. There is no doubt that set specimens of Aculeates show up the undefinable character and appearance of a species in a way that unset ones cannot.

Nevinson was the discoverer in Britain of *Halictus semipunctulatus* (E.M.M. 1904 p.11) and the rediscoverer of *Heriades truncorum* (E.M.M. 1907 p.277), of which he succeeded in establishing a flourishing colony in his own garden. Of other Aculeates he was able to throw new light upon their distributions and habits.

Unfortunately he did not write much, but with characteristic modesty and generosity, he almost invariably placed his knowledge at the disposal of his friends for publication.

Over thirty years ago, Nevinson purchased a strip of Wicken Fen for preservation. This he recently transferred to the National Trust. He was seventy at the time of his death.—WILLOUGHBY GARDNER.

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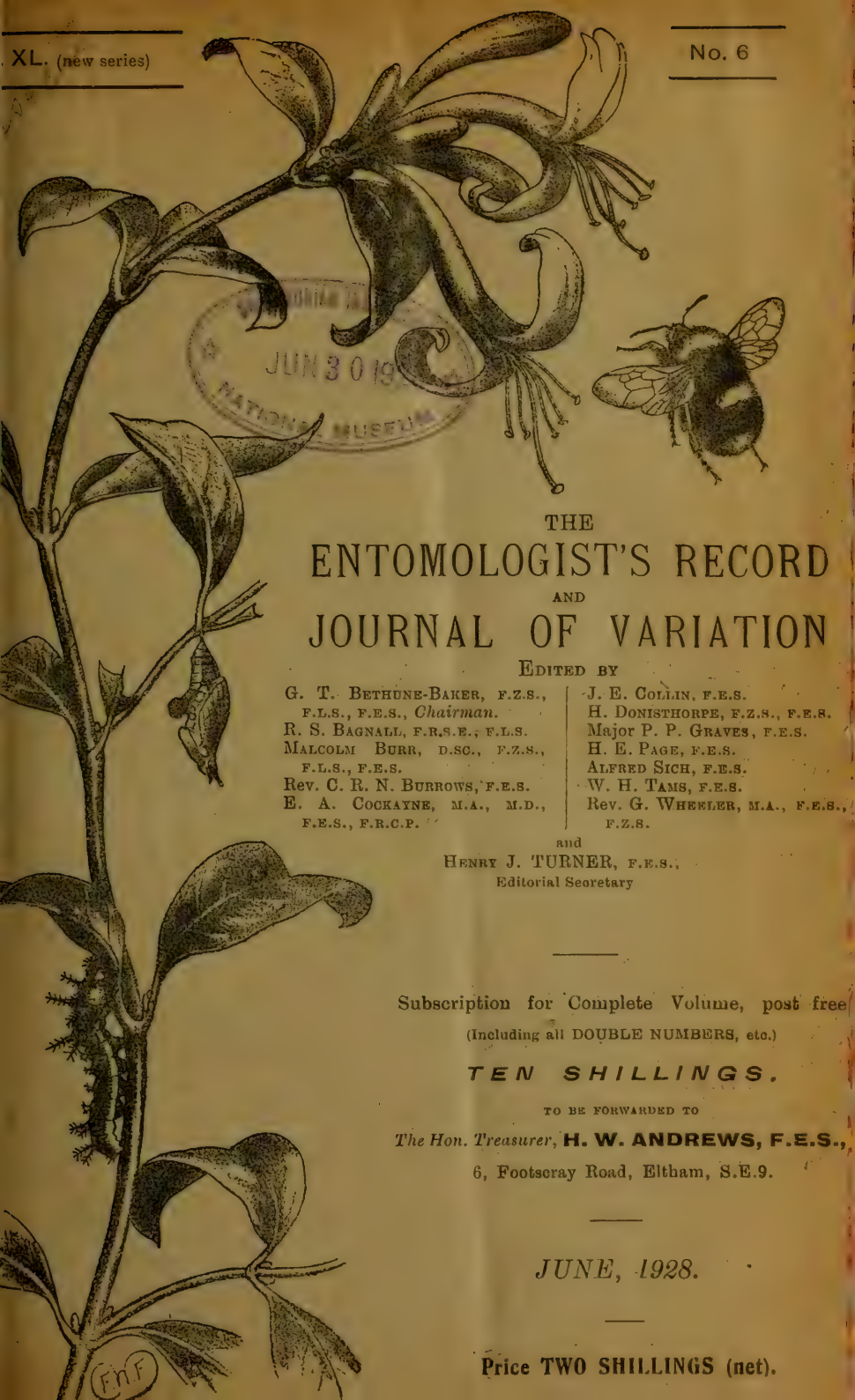
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Collecting in Bulgaria, 1925 and 1927.

By P. P. GRAVES, F.E.S.

(Concluded from page 67.)

In the following list the dates given are for 1927 save when otherwise stated.

GRYPOCERA.—*Nisoniades tages*; not uncommon and fresh at Lulin from 5, vii. *Spilothyrus* (*Carcharodus*) *alceae* and *Spilothyrus althaeae*; occasionally in the plains and in the mountains respectively. My *alceae* are transitional to *australis*, Z., my *althaeae* very large and dark. *Hesperia sidae*; going over in the mountains b. and m. vii. *H. malvae*; IInd Gen. at Pancharevo 20, vii. and Lulin 23, vii., very fresh but uncommon. *H. armoricanus*; a fresh ♂ in the Kresna Defile 6, vii.; a few at Pancharevo and Lulin with *H. malvae*. *H. alveus*; a large race, possibly *trebericensis*, Warr. (= *reverdini*, Schaw. nom. praeocc.), near Chamkurya in late July, 1925; one at Sary-Gyol, 17, vii., 1927. *Thymelicus acteon*; going over at Lulin and uncommon 5, vii. *Adopaea flava* and *A. lineola*; worn in the plains and at moderate heights in early July. *Argiades sylvanus*; of the large nomotypical race common from 2,800 ft. to 4,000 ft. and fresh.

RHOPALOCERA, *Lycaenidae*.—*Lycaena virgaureae*.—[Following Barnes and Lindsay I use *Lycaena* as the generic name instead of *Heodes*, Dall.], abundant in the Rilska valley and near Chamkurya; I also took it at Kostenetz and on Vitosh. The race is described by me elsewhere as *balcanicola*. *L. thersamon*; one ♂ Kresna, 6, vii. *L. hippothoe* sub-sp. *leonhardi*, Fruhst.; apparently a good subspecies, common, though generally worn, between 4,300 ft. and 5,800 ft. in the Chamkurya district in 1925. A few worn out stragglers in mid-July, 1927. *L. alciphron* sub-sp. *melibaeus*, Stgr.; as far as I can judge from a short series taken at Kostenetz and Lulin, and from Vitosh specimens taken by Chorbajieff, Bulgarian specimens from these localities differ in no essential from *melibaeus*, Stgr.

L. dorilis; frequent at Lulin, Kostenetz and in the Rilska valley, and of normal Central European facies. *L. phlaeas*; typical at Sary-Gyol. Singly at lower elevations where specimens resembling German *eleus* and the much more suffused *aestivus*, Z., occurred. I was, no doubt, between the broods. *Maculinia arion*; singly and fresh at Varnik and Slivnitsa in 1925. Worn out at Lulin 5, vii., 1927. *M. alcon*; a very large and striking race, which most certainly will deserve a name, occurred at one locality at Varnik 26, vii., 1925, and 16 and 22, vii., 1927. I have a similar specimen from Vitosh. *Scolitantides baton*; a worn-out ♀, Lulin 23, vii. *Everes argiades*, *E. alcetas*, *E. decolorata*; *Plebeius agestis* (= *medon*, Hufn.); Kostenetz, f. *calida*, Bell. 8, vii. Vitosh and Rilska, nearer *aestiva*, Z., a few, see my previous remarks. *Pleb. argus* (*aegon*); generally abundant to 4,500 ft. Specimens taken at Lulin 23, vii., were often unusually small, no larger, indeed, than many *Chilades trochilus*. I gather from Bulgarian collectors that this is not usual, and that the small size of these specimens must be ascribed to last year's phenomenal drought. *Plebeius argyrognomon*; two ♂♂ from Kostenetz of a race like *ligurica*, as are two more taken by Dr. Buresch in 1926 at Chepino. Capt. A. F. Hemming, who has kindly examined the genitalia of a Kostenetz ♀, finds that it is *argyrognomon*. At Pancharevo and Lulin

I took single specimens of another race of *argyrognomon* somewhat resembling Austrian specimens from low elevations. I hope to learn more of the variation of this species in Bulgaria before long. *Polyommatus anteros*; a ♂ at Lulin, 23, vii. *P. eumedon*; Vitosh, 4, vii. *P. semiarqus* subsp. *balcanica*, Tutt.; still out on the mountains in 1925. Worn-out, except on Vitosh, in 1927. *P. amandus*; a worn ♂ on Vitosh, 4, vii. *P. icarus*; generally abundant on the low ground after mid-July in 1927. Some specimens were transitional to *zellerica*, Vrtý., others of that race. Wasted specimens of the 1st Gen. occurred at Sary-Gyol. Very few ♀ ♀ had any bluish suffusion on the upper side. *P. eroides*; a few ♂ ♂, some fresh, at Chornata Skaler and Sary-Gyol. *P. meleager*; smallish specimens, the ♀ ♀ of the blue form, occurred not uncommonly at Lulin, Kostenetz and in the Kresna defile. *P. thersites*; one ♀ at Lulin, 23, vii. I think this is the first record for Bulgaria proper. It occurs in W. Thrace and in Macedonia. *P. thetis*, 1Ind Gen.; not fully out before 23, vii., at Lulin. The 1st Gen. in Bulgaria, N. of the Rhodope, resembles Istrian specimens. I took a fine ♂ ab. *obsoleta* in the Kresna defile. *P. coridon*; one fresh ♂ at Lulin, 23, vii. The Bulgarian race seems to be the nominotypical one from Styria.

Callophrys rubi; a worn survivor at Lulin 5, vii. *Strymon ilicis*; fragmentary examples at lower elevations in July, 1927. *S. acaciae* sub-sp. *nostras*, Courv.; still fresh at Rilo near the Monastery 7, vii., and worn at Lulin and Kostenetz. *S. w-album*; Rilska Valley 7, vii., much worn. *Ruralis betulae*; ♂ ♀ at Pancharevo 20, vii., on elder flowers, and a ♂ at Lulin 23, vii. This species was considered rare in Bulgaria.

Papilionidae.—*Iphiclide podalirius*; not uncommon up to 3,500 ft., going a little higher at Chamkurya. Strangely enough *P. machaon*, which is very frequent about Constantinople, is rare in Bulgaria save near Burgas. *Parnassius apollo*; a few were taken at Chornata Skala near Chamkurya 17, vii. In 1925 it was frequent at Varnik and occurred at Slivnitza in late July. Rilska Valley, one ♂ only 7, vii. Really abundant beside the torrent above Kostenetz Banya, 8, vii. The Kostenetz specimens are uncommonly fine and large. Bulgarian entomologists recognise four races of *apollo* viz.:—that of Lulin and Vitosh, which is, they say, the largest; the race of the Rhodope, that of the Stara Planina, and the smaller race of the Pirin (and ? Rilo). *P. mnemosyne* sub-sp. *deiatarus*, Fruhst.; a worn ♀ taken by Mme. Buresch at Kostenetz 8, vii.

Pieridae.—*Aporia crataegi*; worn specimens in the mountains on both my visits. *Pieris rapae*; not common at most localities below 4,500ft. *P. manni*; 1Ind. Gen., specimens were taken at Kresna, 6, vii., Kostenetz 8, vii., and Chornata Skala, Chamkurya 16, vii. *P. napi*; the fine 1Ind. Gen. of West Bulgaria (Lulin) which also occurs at Slivna and (with less heavily marked and smaller ♀ ♀) near Constantinople deserves study. Unfortunately it was not common where I found it in Bulgaria last year (Lulin, Kostenetz, Chamkurya). It is characterized by the presence of a considerable proportion of large ♀ ♀ with very heavy markings on the upper side of the forewings which are very rounded and with very dark marked scaling of the extremities of the veins on the upper side of the hindwings. *Pontia daplidice*; seen or taken at all stations. *Leptosia sinapis*; 1st. Gen., still

out at Chamkurya 25, vii., 1925, while the Ind. Gen. was out at Slivnitza some 1200ft. below. In 1927 I took large specimens of the summer *diniensis* in several localities below 3,500ft. *Colias croceus*; here and there at all elevations. *C. hyale*; this species is of varying frequency in Bulgaria. It seemed not uncommon last year when I took it on several occasions at Lulin, Kostenetz, etc. *C. myrmidone* sub-sp. *balkanica*; Mme. Buresch took a worn ♂ which she kindly gave me at Kostenetz Banya on July 8th. A huge and magnificent ♀ prudently kept to the high rocks and evaded pursuit. *Gonepteryx rhamni*; only at Kostenetz where I took four fresh specimens, larger than the Central European race but smaller than those which I have from Constantinople. Probably race *transiens*, Vrtý.

Nymphalidae.—*Dryas pandora*; seen in the Kresna defile and at Chamkurya. *D. paphia*; frequent in woods in the lower mountain valleys but much less frequent higher up. My fairly good Bulgarian series from a good many localities answers to Verity's description of *magnata* 'Maine-et-Loire.' *Issoria lathonia*; frequent. My Bulgarian summer specimens answer generally to *emiflorens*, Vrtý.; my Constantinople summer and autumn specimens to *florens*, Vrtý. *Argynnis aglaia*; a very fine ♀ from Lulin 5, vii. Worn at Kostenetz 8, vii. Not uncommon at Slivnitza and Varnik in 1925, rather rare in 1927. Apparently variable in Bulgaria. *A. niobe*; all specimens taken were of the f. *eris*; most were worn in July, more especially at Kostenetz. *Niobe* is variable in Bulgaria in size, depth of suffusion on the upper side of the ♀ and in the marking of the hindwings in both sexes. *A. cydippe*; of the f. *cleodora* occurred at Slivnitza and at Chornata Skala, the last locality being some 4,500ft. above sea level. I have not nearly enough specimens from Bulgaria to hazard an opinion as to the race or subspecies to which these should be assigned. *Brenthis daphne*; worn out at Kostenetz 8, vii. *B. dia*; Rilska Valley, and Kostenetz in small numbers of the Ind. Gen. *B. euphrosyne*; still out though in bad order at Sary-Gyol in 1925. *B. pales* sub-sp. *balkanicus*; abundant in July on the Sary Gyol plateau. *Polygonia egea*; Kresna defile. *P. c-album*; generally distributed. *Vanessa io*; one taken by Mlle. Zdravka Buresch at Chamkurya 25, vii., 1925. *Euvanessa antiopa*; this species is rare in Bulgaria. I saw one at Slivnitza in 1925 and one at Kostenetz in 1927. *Aglais urticae*; not seen in 1925. Fairly common on the mountains about Chamkurya in 1927. All taken were *urticae* not *turcica*. *Eugonia polychloros* or *xanthomelas*; I made unsuccessful attempts to capture one or the other of these species at Chamkurya in 1925 and at Kostenetz. Dr. Buresch who was present each time thought that the insects which I missed were *xanthomelas*, which is more frequent in the mountains than *polychloros*. *Pyrameis cardui*; occasionally. *P. atalanta*; worn specimens were seen. *Limnitis rivularis*; very fresh in the Kresna defile 6, vii. *Limnitis populi* subsp. *rilicola*; I saw specimens of this fine insect at Slivnitza in 1925 and in the Rilska valley last year, but in each case they sailed away from the inaccessible boughs on which they perched and I was 'left lamenting.' *Neptis coenobita* sub-sp. *lucilla*; I took three worn specimens of this graceful flier at Kostenetz Banya. *Apatura ilia*; seen at Lulin 5, vii. *A. iris*; taken at Slivnitza in 1925 and below Rilo Monastery, where it was not rare in 1927. No females were seen.

Satyridae.—*Pararge megera*: a few second-brood specimens, by no means *lyssa*, at Lulin and Pancharevo. *P. maera*: large dark Ist. Gen. specimens in some respects resembling *monotonia*, Schilde, were frequent near Chamkurya in late July, 1925. The species was almost over in the mountains in 1927 and I saw no Ist. Gen. specimens in the plains. E. Rumanian *maera* seem distinctly closer to *orientalis*, Stgr., which is the form of the summer brood at Constantinople. Ist. Gen. *maera* from Constantinople are less obviously *orientalis* than those which I have from Palestine. *P. aegeria* f. *egerides* Stgr.; I have one specimen from Pancharevo. I saw another by the torrent at Kostenetz. *Nytha circe*: one ♂ Rilska Valley, 7, vii. *N. hermione*, Stgr.; two ♂♂ at the same locality, 7, vii., determined by Capt. Hemming who finds the Constantinople '*hermione*' from the European shore of the Bosphorus to be *syriaca*, Stgr. *N. fatua*; Kresna Defile. *Hipparchia arethusa*; just emerging near Sofia late in July. *Epinephele jurtina*; common at low and moderate elevations and of large size. *Hyponphele lycaon*; a small race with dark undersides to the hind wings occurred at Varnik from 14, vii. I have only three ♀♀ and so will defer any description of it to a future occasion. *Aphantopus hyperantus*; worn below Chamkurya 25, vii, 1925. Often fresh and not uncommon in the Rilska valley and at Lulin early in July, 1927. *Coenonympha pamphilus* f. *marginata*; a few at Lulin and Chamkurya. *C. tiphon* sub-sp. *rhodopensis*, Elwes; still fairly fresh at Sitnyakovo and Sary Gyol in late July, 1925, and only represented by remnants in 1927. *C. arcania*; Vitosh and Lulin b. vii. *C. iphis*: in meadows at Varnik; apparently a very different race to that of lower Austria. *Erebia epiphron* sub-sp. *orientalis*, Elwes; Sary-Gyol, generally worn in late July, 1925, and only represented by one worn specimen in 1927. *E. oeme*, subsp. ? *zagora*, Fruhstorfer; Dr. Higgins recently kindly called my attention to the presence of some *E. oeme* among the large *E. epiphron* subsp. *orientalis* taken by me at Sary Gyol in 1925. I am not yet certain whether *zagora* is more than a frequent form in Bulgaria of the subsp. or group known as *spodia*. *E. ligea*; frequent from 2,700 ft. to 4,500 ft. *E. euryale*; from Chamkurya up to Sary-Gyol where it is abundant. Specimens from Bulgaria agree well with *E. 'adyte'* sub-sp. *syrmia*, as described by Fruhstorfer. *E. tyndarus* sub-sp. *balkanica*, Rebel (*bosniaca*, Nicholl is a *nomen nudum* and ante-dated by *balkanica*, Nich., which also lacks a description); abundant on the Sary Gyol Plateau. *Melanargia larissa*; Kresna Defile 6, vii. *M. galatea* ssp. *satnia*; abundant at Lulin and Varnik, generally of moderate size, with widespread dark marking on the upperside, particularly in the case of the ♀♀. Mountain specimens seem rather smaller than those of the plain. Since the first part of this paper was printed I have seen Fruhstorfer's figure of *M. galatea* subsp. *satnia* (*Arch. Naturg.* Vol. 82, A. 2, 1916), and find it agrees with my Lulin specimens. The mountain *galatea* from Varnik, Slivnitsa and the Rilska are somewhat nearer the so-called *turcica*, B., of Thrace, etc., which, though very dark, are by no means so heavily suffused as is Milliére's figure. This figure, indeed, certainly represents an exceptional aberration.

Quedius infuscatus, Er., a species of Coleoptera new to Britain.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

"29. *Q. infuscatus*: Nigro-piceus, capite nigro, antennarum basi, abdomine segmentorum marginibus pedibusque piceo-testaceis, scutello parce punctato, elytris fusco-testaceis, dorso nigricantibus, parce subtilius punctatis.—Long $2\frac{1}{2}$ lin. Habitat Lutetiae, Coll. Dom. Aubé."

Erichson, G. F. *Gen. Spec. Staph. Berolini* 543 (1840).

On February 1st, 1928, I took two specimens of this beetle, which is new to our list, in a bird's nest from an old elm tree, which had been blown down in Windsor Forest.

Erichson compares this species with *Q. rufipes*, Gr., but superficially it much resembles *Q. micros*, Gr.

I at first thought it was that species, but perceiving that the eyes were a little larger (I did not, however, come to the conclusion that the eyes were large enough for the subgenus *Microsaurus*, to which *Q. infuscatus* belongs), and the insect darker, etc., I sent a specimen to B. S. Williams, who has been doing some very good work with the *Staphylinidae*, including the genus *Quedius*, recently, for his opinion. He also considered it was new to our list and suggested that, by Gridelli it was *Q. infuscatus*, Er.

Déville has now confirmed that identification, and he tells me he knows the species from the N.W. of France, Calais, Boulogne, and towards the mouth of the Seine; taken in bird's nests, and in hollow trees beneath owls' nests, etc.

The European Catalogue gives France, Austria and Germany as the distribution of this insect.

This makes the 19th species of insect, of which 16 are coleoptera, new to Britain, that I have taken in Windsor Forest in the last few years.

Euxoa tritici, L., ab. pseudogothica, Curtis, a Myth.

By A. J. WIGHTMAN, F.E.S.

On page 37 of the present volume, Mr. E. Parkinson Curtis re-asserts that Tutt on page 46, Vol. 2., *Brit. Noctuae*, described a form of *E. tritici* as *subgothica*, and he still wishes to rename this *pseudogothica*, Curtis.

But I must repeat that Tutt does not there describe any forms of *E. tritici* at all, but simply gives a table of forms and *supposed* forms of that species, and for the purpose of his table there gives a curt summary of the special features of each (a method he followed with most of the variable species he dealt with), the full descriptions on which the names are based follow in due order, pages 47-58.

On page 46, Group E. (ground colour pale greyish fuscous), letter b, No. 2, he says "with dark space between stigmata and no cuneiform spots"—sub.-var. *subgothica*, Haw., and in due order on page 51 we find the descriptions on which this name is based, one is Haworth's original description of *subgothica*, the other Humphrey and Westwood's description of *subgothica*, Haw.; there is not a word about *subgothica*, Tutt, and no new description. That Tutt may have possessed

forms of *E. tritici*, which he had in mind as *subgothica*, Haw., when compiling the table, I do not dispute, although it is a mere conjecture, but even if this were proved it would not help Mr. Parkinson Curtis in his argument. We are not dealing with what Tutt had in mind, or what Tutt thought Haworth had had in mind, but with what they did, and about this there can be no dispute. Haworth described as *subgothica* an American species, now known as *Feltia jaculifera*, Gn., and Tutt added Haworth's name and description to his table of *E. tritici* vars. in error. He did not describe a new form of *E. tritici* and call it *subgothica*.

Mr. Parkinson Curtis says, "I was brought up to believe that a name was a word attached to an object to distinguish it from other objects." So was I, and that was why I disagreed with his nomenclature.

He brings forward a new name, *pseudogothica*, which he says represents a form of *E. tritici*, and refers us to Tutt, *Brit. Noc. and vars.*, page 46, vol. 2, for a description of his type. Here we find a summary of special features of a supposed form of *E. tritici*, which the author himself says = *subgothica*, Haw., and evidently meant what he said, as he quotes that author's description in connection with this form. So the type description of *pseudogothica*, Curtis, is Haworth's *subgothica*, and this, Mr. Curtis admits, is a description of *Feltia jaculifera*, Gn., a distinct species, not even in the same genus. We face then the fact, not supposition, that the form of *E. tritici* to be called *pseudogothica*, Curtis, has as its type description the identical description which Mr. Parkinson Curtis has himself shown refers correctly to *Feltia jaculifera*, Gn., two very different objects described as being exactly alike. Surely this is a breach of the rule he himself quotes—as to the purpose of a name.

That because Tutt published a table of supposed forms of *E. tritici*, and included among them a distinct species, his error must stand (merely renamed to save confusion) and cannot be suppressed as, Mr. Curtis asserts the code lays down, I do not believe. I can find nothing there myself which could be stretched to mean any such thing. Had Tutt described a new form, and merely used some name not available, it would be a different matter.

Var. *subgothica*, Haw., as a form of *E. tritici*, is a myth, and so therefore is *pseudogothica*, Curt., as the matter stands at present.

An Essay on the Origins of the Geographical Variations of the Rhopalocera in Europe exemplified by *Melitaea aurinia*, Rott.

By ROGER VERITY, M.D.

(Continued from page 45.)

I have seen specimens of *asiatica*, Stdgr., sent by Staudinger himself to Turati and I must discard my supposition that it belonged to the same exerge as *glaciegenita*. It is a small and dark alpine race of the *alexandrina*, Stdgr., group, which has a sharp underside pattern, somewhat reminding one of the *maturna*, Kind. It thus seems as if *glaciegenita*, with its peculiar underside, were an exerge standing apart from the other races in Asia as well as in Europe.

Exerge *glaciegenita*, Vrtv., belongs to that group of species

and exerges which presumably first repopulated Siberia and Northern and Central Europe, following closely the outskirts of the ice-sheet, when the maximum periods of glaciation, which occurred in Pleistocene times, were closing and they were beginning to allow butterfly life in those regions. As the climate became more temperate, the fauna to which belongs nymotypical *aurinia* followed, from warmer places of refuge and superseded it. The former then shrank to localities, where the climatic conditions favoured it, so that it still survives near the glaciers of the Alps of Europe and of Asia and, in the case of some species, also in the arctic region. It would no doubt rapidly spread again if a new period of glaciation occurred. Thus nature keeps species ready to face all eventualities. We will presently see it stands to reason that nymotypical *aurinia*, as it exists now in Central and part of Northern Europe, was the last form of the species which reached it. It obviously belongs to the great flow of plants and animals which repopulated those parts of Europe, as just mentioned, after the most severe periods of glaciation in Pleistocene times, because the broad Arctic-Aralo-Caspian channel, which separated Europe from Asia, had only then dried up to a considerable extent. With this migration in a direct line from East to West came the species which are broadspread now in temperate Asia and which extend to Central Europe, but which do not exist in Southern Europe, such as *Vacciniina optilete*, *M. maturna*, *Apatura iris*, *Limenitis populi*, *Araschnia levana*, and many others. It seems, however, that long before those times *aurinia* had already spread westward along a more southern route. As soon as the first isthmus across the Thetys Sea emerged, south of what is now the Caspian, early in Miocene times, a horde of plants and animals, with constitutions adjusted to a temperate climate, through having lived for ages in Arctic and Northern Asia, urged on by a decrease of temperature, which came on all through the Miocene, moved towards the Mediterranean lands, which were then, for the same reason, passing from hotter conditions to the temperate ones that suited them exactly, and to which the extremely old and eminently tropical African species were, instead, not able to acclimatise themselves sufficiently firmly and broadly. The result was that the Asiatic genera occupied these areas to incredibly great distances; for instance, the *Saturniidae* genus *Actias*, from its cradle in north-eastern Asia, actually stretched across North Africa to Spain and to the Western Alps and across the highlands of Abyssinia. With it, presumably, came also *aurinia*, under a form which, very likely, resembled our *provincialis*, B., but which in the new surroundings produced the "local satellite" species *M. desfontainii*, God., now in existence in Morocco and southern and central Spain, unquestionably distinct, because it often flies with exerge *beckeri*, Led., of *aurinia*, but much more anabological and evidently organically adjusted to stand heat and aridity to a much greater extent. It is worthy of notice that exactly the same phenomenon took place in *M. phoebe*, which produced the local satellite *aetherie*, Hb., and that the latter spreads from Sicily to Andalusia, so that it seems to have been evolving as *phoebe* passed over the isthmus from Greece to Tunis. As the early Miocene period was still hot, one can suppose the first migrants had to adapt themselves to this climate, as well as to other local changes, and that they had to stand a southern climate for long ages, because Andalusia was then

part of Africa, but it was separated from central Spain by the broad North Baetic channel, which stopped their onward course, until it dried up and the outlet of the Western Mediterranean shifted for a short time to the straits between the El Riff and the Atlas and then to the Gibraltar Straits of to-day. It is very likely that flows of *aurinia* occurred more than once in north Africa and Andalusia during the suitable climate of late Miocene and early Pliocene epochs, and that they were wiped away by the subsequent heat and drought of the late Pliocene, except a colony, which had reached the then very marshy tablelands of central and northern Spain. It probably arrived there during the early Pliocene, when, for a comparatively short time, the three sea channels, which succeeded each other, were all closed and the Iberic isthmus lay before it, open to easy migration towards the latitude the species found more suitable to itself; the Gibraltar channel then, in the late Pliocene, cut its retreat further to the south than Andalusia, and cut the *desfontainii* area in two portions, as they are now; the latter must then already have acquired its specific distinctness, so that the two cohabited, without interbreeding, as at the present day, although *aurinia* has begun to transform in about, although not quite, the same way as *desfontainii*, and that colony has turned into *beckeri*, Led. = *iberica*, Obth.* This Spuler considers a distinct species, on the strength of the entirely black antennae, with no white rings, of the shorter fore portion of hindwing and of the straighter band across the latter. I should however consider it an exurge of *aurinia*, like *glaciegenita*, until it is proved they cannot interbreed. Whilst this was going on in the Western Mediterranean the Asiatic hordes were passing into Europe, also from Asia Minor into the Balkans (their advance was barred off northward by the great stretch of saline morasses where the Danube basin is now). These regions must have been a route of advance and retreat, according to the changes of climate, all through Miocene and Pliocene times, till at the end of the latter it was rendered nearly impracticable by the sinking of the great plains under the sea level, which produced the Aegean Sea. The ancestors of race *provincialis*, B., of *M. aurinia* must have established themselves all along this route and it is remarkable how, more or less² exactly the same race is found in all this zone, from Asia Minor to the south of France, which was, till a comparatively very recent epoch, connected, together with Piedmont, in a direct way to the Dinaric Alps of the Balkans across what is now the Northern Adriatic (races *aurunca*, Trti., *balcanica*, Schaw., and *orientalis*, H.S., are but slight local variations of it). Its European portion, cut off by the Aegean, no doubt, took refuge during the Pleistocene glaciation in the still small, but growing, southern Italy, as well as in the southern Balkans, but subsequently, and perhaps only recently, the former peninsula became too dry for it and a single little colony, to our knowledge, survives around the snow-pits, at the top of the Aurunci Mts., between Rome and Naples. The Pleistocene, and possibly later, migrations from France into the Italian peninsula seems to be proved by the presence of small isolated colonies of *A. euphenoides* and of *C. dorus*,

* I must draw attention to the curious inversion of the right of priority made in the use of these synonyms by Staudinger and by all authors. That they are synonyms there is no doubt, as they were both based on Herrich-Schäffer's fig. 1 and 2, but *beckeri* is the older by thirty years.

and other species of unquestionable western origin. It is noteworthy that the distribution of species as different from *aurinia* as, for instance, *Papilio alexanor* and *Pieris ergane* should coincide fundamentally with that of *provincialis*, showing a considerable fauna shared the same fates; *alexanor* survives in one valley of southern Calabria; in *ergane* things have worked the other way round, as far as abundance is concerned, because it is broadspread in southern Italy, whilst two isolated colonies have recently been discovered by Turati and by myself on the Lake of Como and in the Cottian Alps, but otherwise it accompanies *alexanor* and *provincialis* from the Western Alps to the eastern side of Asia Minor. Let us now return to the subject which has led us to such distant reflexions: the considerable difference between *merope* and *glaciegenita*.

I have pointed out that the latter presumably reached Europe by the direct eastern route and that it still exists in the mountains of Central Asia. It is, instead, easy to see at a glance that the former is nothing but a degenerate *provincialis*, and thus comes from an entirely different source. The difference between the two exerges they belong to evidently originated in Siberia, because *mandschurica*, St McGr., obviously exhibits on both surfaces the dull, uniform ochreous colour of *merope* and *moritura* and of some *provincialis*. Specimens of the latter from the French watershed of the Alps are not unfrequently of a uniform pale ochreous above and some exhibit a uniform washing of warm yellow all over the underside of the hindwings, tinging even the central row of usually white spaces, so that they obviously point to *merope*, and a complete series of transitions should not be difficult to put together. Altitude might account alone for the degeneracy of *merope*, but the causes which have made Italy uninhabitable to this species seem to contribute as well, because its last representatives reach the plain of Piedmont and, notwithstanding the low altitude, they maintain the chief features of *merope*. My examples from Mt. Musinè, at the entrance of the Susa Valley, and from the Venaria Park, at the gateway of Turin, differ from those of high altitudes by their larger size, by the thicker scaling, by their remarkably warm tinge of ochreous on both surfaces, by the thinner, though very complete and regular, black netting, by the reduced black suffusion at the base, and by the complete series of capillary streaks standing out boldly on the very warm ochreous ground colour of hindwings on underside; the whole tone of both surfaces is, however, a sharp contrast, by its dullness, to the brightness even of the *provincialis*, which resemble them most, and no specimen of one race could be mistaken for the other. I name it *moritura*. Gianelli (*Ann. Acc. Agric. Torino*, XXXIII., p. 19 (1890)) has named *minima* an extremely small form from the Venaria, presumably from a single dwarf individual. I have examined Turati's series of co-types of *comacina* and I find its position is intermediate between *moritura* and *provincialis*, as it constantly has a paler and colder tone of fulvous than the former, and some females have distinctly lighter areas on both surfaces. As to Oberthür, mentioned above, we are now in a position to see that he was very wrong in mixing up the Larche, which he calls the French Alps, race with the one of Western France, and namely of Rennes, called *debilis* by him; he evidently neglected to compare the underside of the wings; the

Pyrenées Orientales race he lumps with them is, in reality, similar to *debilis*, but the scaling is slightly thinner and the pattern of the underside is distinctly more effaced: race **pyrenes-debilis**. The beautiful series of specimens I have received from Sorin, collected at St. Côte Bazas, in the Gironde, exhibits a remarkable range of variation, from a form (about 10%) nearly as large as the average *provincialis*, and quite as bright, to the smallest *aurinia* I have seen and identical in some examples with *anglicana*, Frhst., and with *hibernica*, Birch., by the sharp contrast of yellowish white and deep red bands on both surfaces and by the extent of the black markings; this small form in the male sex is not larger than *glaciegenita*, with the wings quite as narrow and pointed as in the latter, and it constitutes about 75% of the race; the females, instead, are rather larger than in nymotypical *aurinia*. The race is thus a remarkable one and its designation seems to be: race **debilis-provincialis** (Obth.-Boisd.), Vrtý. The striking analogy of all the races of the Atlantic coast, from the British Islands to France, with *glaciegenita* and the fact that nymotypical *aurinia* of Central Europe shows no tendency to vary in this direction, even in the localities nearest to *glaciegenita*, lead one to suspect that they are descendants of the latter, which, in company of the ancestors of the Scotch *Erebidae*, reached the land, stretching out into the Atlantic, as remnants of the North Atlantis continent, where, under the influence of the Gulf Stream, the oldest British species are believed to have escaped the worst periods of glaciation. There they may have found such favourable conditions in the combination of moisture with a milder temperature that they developed at an early date into the stronger races we have before us and they were able to hold their ground (no doubt assisted, in the case of the British races, by the sinking of the Channel, which isolated them) against the invasion of nymotypical *aurinia*, which followed, when glaciation was over, and which stamped out the weaker *glaciegenita* of Central Europe before it had time to acclimatise itself to the temperate climate. Whether *debilis* belongs to exerge *glaciegenita* or to exerge *aurinia*, the remarkable variations in the Gironde are explained by the fact it meets again there with *provincialis* after those two groups have been separated for long ages and the two, only being exerges and not species, interbreed frequently. This however might be the case even if *debilis* belonged to exerge *aurinia*, and not to *glaciegenita*, because it stands to reason that one should suspect *provincialis* to constitute an exerge, distinct also from nymotypical *aurinia*, considering the distinct Asiatic origins we suppose them to have, although the degree of differentiation attained is certainly less than that attained by exerge *beckeri* after or during its long journey through Africa. It is instructive to notice the remarkable analogy between *aurinia* and *Coenonympha pamphilus*, L., as worked out by me in "The geographical and seasonal variations of *Coenonympha pamphilus*, L." (*Zeitschr. für wissensch. Insektenbiologie*, XXI., pp. 101-208, Nov., 1926). Here too one finds the highly differentiated exerge *lyllus*, Esp., all along the Africo-Iberic route, which meets between Aragon and Catalonia, with the nymotypical exerge, from the Siberio-Russian one, and one finds the *marginata*, Rühl, group of races all along the "Aegeo-Dinaric" route, from Asia Minor to Italy, which stands to nymotypical *pamphilus* exactly as *provincialis* stands to nymotypical *aurinia*, being far less highly differen-

tiated than *lyllus*. This identity of variations in such extended and varied areas and in species which are so different in structure, in food-plants and in habits, furnishes data of no small importance in researches on the origins of exerges and species. Another enlightening case is afforded by *Aricia cramera* (Esch.), Vrtý., which obviously accompanied *Euchloë charlonia* and *Pyrameis indica*, when they spread from Southern Asia to the Canary Islands during the Miocene; and which now inhabits Morocco, Algeria and the Iberic peninsula as a perfectly distinct species from *A. medon*, Hüfn. I have worked out this interesting question at length in an article for the *Annales* of the *Soc. Entom. de France*. Another exerge of *medon* seems to be one of the very rare relics of pre-glacial times in Northern Europe; the species must have spread there from the south and, as described by Harrison in the *Trans. Nat. Hist. Soc. Northumb.*, VI., 1, p. 89 (1924), a colony of it must have retired during the periods of glaciation in the north Atlantis continent, where it succeeded in surviving by altering its organic balance into the Scotch *artaxerxes*, F., of the present day.

(To be continued.)

Turin, Arquata Scrivia and Oulx, in May-June, 1927.

By LIEUT. E. B. ASHBY, F.Z.S., F.E.S.

Leaving London on May 14th, I reached Turin the following day at 3.0 p.m., in time to get out to Stupinigi Wood for an afternoon's collecting. The sun did not shine and I had to content myself with a small bag of 18 including *Euchloë cardamines*, *Augiades sylvanus*, *Melitaea pseudathalia*, *Coenonympha arcania*; the moths, *Diacrisia mendica*, *Spilodes verticalis*, L., *Ebulea sambucalis*; and the beetle *Lamia textor*.

May 16th.—This morning in Stupinigi Wood the sun shone well and I got fresh *M. pseudo-athalia*; *Plebeius argus* ab. *argyrognomon*, Berg., in some numbers and beautifully fresh; *C. arcania*; *Polyommatus thetis*; *P. icarus*; *A. sylvanus*; some diptera including *Ephippium thoracicum* and coleoptera and the Rhynchotid *Cercopis sanguinolenta*. In the afternoon at Madonna del Pilone the other side of Turin I found the collecting ground much restricted since I was last there in 1919. Much ground has been absorbed for private use. I got little beyond *P. argyrognomon*, the moth *Abraxas sylvata*; and a fine female of the beetle *Meloë proscarabaeus*, L.

May 17th.—This morning I went out towards Venaria Reale but I did not succeed in finding the ground there where *M. athalia* and *M. pseudathalia* both fly together. Making for the banks of the River Stura I collected a number of *P. argus* ab. *argyrognomon*, and just beyond the bridge over the river Stura near a small place I believe named Barca, I found a number of ♂'s and ♀'s of a *Cimber*, all of which are *Cimber lutea*, L. The males are of the dark *nigra* form, teste Dr. Waterston. They are sluggish insects and can easily be caught in the hand as they cling to the stems of young willows growing along the river banks. I did not meet with these insects elsewhere during this trip this year, though the Italian natural

history books speak of these insects as "È specie frequente in tutta Italia; vola nel mese di maggio."

Continuing along the river bank I reached my old collecting ground of 1919 and 1921 below and opposite Soperga Church, and near the terminus of the electric trams from Turin at Regia Parco.

I found this had been a good deal drained since 1921 and in time I fear it will mostly go and with it *Libellula pedemontana*, which flies there in the summer months. I got several larvae and beetles on the reeds, etc., which at present survive.

May 18th.—To Stupinigi Wood again. I warn anyone who visits Stupinigi in the future not to try and go there on Sunday afternoon or Thursday afternoon, as the races at Mirafiori, a short distance before Stupinigi Wood, are held on both these afternoons throughout the fine season and it is extremely difficult to get a seat on the crowded steam tramway or in the electric trains.

Unfortunately there is nowhere to stay at Mirafiori or Stupinigi village so it is always necessary to work this wood from Turin. This damp wood is as good as ever, but the heat is sometimes very great. *Leptosia sinapis* and *P. thetis* were fresh out to-day, but I saw no sign of the first brood of the *rutilus* form of *Chrysophanus dispar* in the bed of the Sangone river around. I took a male of the bee *Andrena morio*. A very hot day which ended in a shower of rain at 7.0 p.m. A fine specimen of *Mimas tiliae* was found on the ground at Mirafiori.

May 19th.—To Avigliana by train from Turin. I walked to the two lakes of Avigliana and went around the second lake. The ground behind it slopes gradually down to the lake in very marshy patches and the going is slow. On this marshy ground I took a fine series of ♂s and ♀s of *Melitaea dictynna* in perfect condition. Flying with the *dictynna* were also a number of *M. pseudathalia* in excellent condition. I also took one ♂ of *Glaucopsyche cyllarus*, the only one seen and a few *L. sinapis* and *P. thetis*, also a specimen of the moths *Agrotis segetis* and *Acontia luctuosa*, and a May-fly freshly emerged.

Reaching the restaurant at Trana, I walked on to Bruino, getting a few coleoptera en route and then took the steam tramway for Turin arriving at 8.0 p.m. During the day I had taken a specimen of the Dipteran *Chrysops caecutiens*, L.

May 20th.—Leaving Turin station at 7.0 a.m., I arrived at Arquata at 9.4 a.m., where a horse carriage met me and drove me to the Hotel Arquata Scrivia which is well managed and for a country inn most excellent in every way. The Railway line is now electrified from Modane as far south as Livorno (Leghorn) and will in time be electrified to Rome, therefore travelling is much quicker now and free from much dust. Arquata has changed little since I was last there in 1919, after living there for about eight months in 1918. There is hardly anything to show now that we had a vast Camp here during the war, except the railway lines and warehouses that we laid down and bequeathed to the Italians; and the British cemetery. This afternoon I went down into the Scrivia valley at the bluff and collected south along the left bank as far as the wooden bridge opposite Vocemola and crossing this, I worked along the right bank north for a short distance and then ascended the course of a brook that comes gurgling down from the hills. In several nice clearings, and on flowery banks I took fresh specimens of *M. phoebe*, *Heodes alciphron*

var. *gordius*, a beautiful form, about midway in the males between the Digne race and the type of *alciphron* from Hungary: also *Polyommatus semiargus*; *P. arragonensis*, *P. argus* ab. *argyrognomon*; *P. cardamines*; *M. cinxia*; *Callophrys rubi*; and several species of coleoptera; the moth *Hemaris tityus* (*bombyliformis*) as it searched the blossoms of *Salvia pratense*; and the Dipteron *Bombylius discolor*, Mik.

May 21st.—This morning the sun did not shine; I ascended the valley which runs from the back of the Hotel Arquata Scrivia up into the hills, some distance up which I climbed, returning by the disused santuario, which overlooks the ruins of Arquata Castle.

In a small bag I obtained the largest female of *Limenitis rivularis* (*camilla*) I have ever taken and a sprinkling of *P. argus* ab. *argyrognomon* with the two "Burnets" *Z. purpuralis* and *Z. oxytropis*, which are abundant here; also the moth *Sterrhia* (*Acidalia*) *ochrata*.

May 22nd.—This afternoon I crossed the Scrivia by the wooden bridge and collected in a nice locality a little way to the right of the village of Vocemola which I have described in *Ent. Record*, vol. XXXI, No. 8-9, 1919 (under date of June 27th, 1918).

Here to-day I took *M. phoebe*; *P. arragonensis*; *P. semiargus*; and the beautiful males of *P. alciphron* var. *gordius*. On the way from the hotel to the wooden bridge just where the road crosses under the railway bridge and it is muddy, I saw a fine male of *Iolana iolas*, which like most other "blues" upon occasion likes puddles. I failed to take it, but I wish to record its appearance, as I have not recorded it for Arquata before, as in May 1918, I was at Vicenza for the whole month. The Zygaenid *Z. oxytropis* was common today.

May 23rd.—To-day I walked up the lateral valley behind the villa Vittoria leading up to the hills. On the high ground I took a single fresh specimen of *Euchloë crameri* (*belia*) which I am also glad to be able to record for Arquata. I took also several quite fresh specimens of *P. semiargus*, and noticed that *C. arcania* and *M. didyma* were beginning to appear. The region of Arquata is sub-alpine in its fauna and flora. I returned by the route mentioned under May 21st. At night the moth *Boarmia rhomboidaria* (*gemmaria*) was captured in my bedroom.

May 25th.—This morning I again ascended the valley which leads behind the Arquata Scrivia Hotel up to the hills. I took *Aporia crataegi*, which I record for Arquata for the first time, also odd specimens of *P. alciphron* var. *gordius*, females of *P. thetis* and a number of males of *P. arragonensis*; the females of this latter were remarkably scarce. I saw one and that too worn to take. *P. semiargus* is pretty numerous, more so than *G. cyllarus*. *L. rivularis* was in most perfect condition and getting common. I took to-day for the first time two specimens of the Moth *Omia cymbalariae*, Hüb.

May 26th.—To-day I walked nearly as far as Gave, whose fine castle built by Napoleon, and until lately used as a prison, stands boldly out on the hills. I did not find the walk profitable, so turned back to the left and walked along due south by the hills; descending to Arquata by the valley which comes out at the back of the Hotel Arquata Scrivia. I got four fine specimens of the blackish Bee *Chalicodoma muraria*, Lep; which were in succession attracted to a certain spot on the road, the reason of which I failed to discover. I also took four quite fresh specimens of the Forester moth, *Ino statices*

and some fresh *Zygæna purpuralis*, and saw a quite fresh specimen of *Pyrameis cardui*; I also captured fresh specimens of *Z. achilleæ*, Esp.; and the best thing in to-day's bag was a fine female of *P. thetis* race *maja*, Verity.

May 27th.—This morning was extremely hot, the sun obscured by haze, a day for insects to emerge, and I took fresh specimens of *Polygonia c-album*; *Rumicia phlaeas*, a female of *A. alciphron* var. *gordius*, and others, some of these with their wings not quite dry; also a specimen of the Dipteron *Bombylius minor*, L.

May 28th.—This morning in the lateral valley immediately behind the hotel, I have taken one fresh specimen of *Hesperia sidae*, which I have not before recorded for Arquata, I took it here previously in June, 1918, but omitted to record it then. Fresh specimens were about to-day of the moth *Heliothis dipsaceus*, L. I have also taken fresh specimens of *Cupido sebrus*; *P. aegon*; *Colias croceus*; and the beautiful Burnet moths *Z. transalpina* ab. *italica*, Dzz., and *Z. achilleæ*, Esp. The females of *P. arragonensis* are now common, but they do not show the tendency to variation in markings on the underside as do the females of *P. coridon* here in July. I have, however, one nice female aberration of *P. arragonensis* together with several fresh specimens of *Spilothyrus alceæ* whose especial habitat here is the valley behind the hotel. Fresh specimens of *Hipocrita jacobææ* and of *Hesperia malvoides* with the Dipteron *Anthrax velutina*, Hoff.; an aberration of *Z. achilleæ*, and *A. sylvanus* completed to-day's list.

(To be concluded.)

Newspaper Entomology.

The herewith speaks for itself. If this be an average sample of newspaper information what about other matter we read day by day?

"The 'plague' of caterpillars in the Farnamullen district of Lisbellaw (Fermanagh) has been the happy hunting ground of entomologists and Government officials during the past week. Since the announcement of the 'plague' these caterpillars have been discovered also in force in other parts of the county.

"Our correspondent who visited the scene of the outbreak, writes that the fields in which the caterpillars are in force are masses of crawling, black creatures, about an inch in length. Even the roadways and lanes are covered with them, particularly in the sunshine. In the fields the caterpillars are as thick as 20 to 30 to the square foot. Some farmers to prevent their ingress to their homesteads have laid around the houses a line of tar.

"Major Henderson, of Lisbellaw, who is home from British Columbia, where he has a large fruit farm, and who has experience of caterpillar plagues, being an authority on entomology, is of opinion that the 'plague' will have passed in a month or so.

"Already some fields have been partially burnt by the farmers, where the long tufts of grass were found thick with the caterpillars.

"Sir Charles Langham, Bart., Tempo Manor, has identified the caterpillars as the harmless *melitoea aurinia*, known as the 'greasy fritillary.' He says the caterpillars feed on weed in wet pasture land and, therefore, do good." NORTHERN WHIG, May 4th.

NOTES ON COLLECTING, etc.

THE OVIPOSITION OF *GONEPTERYX RHAMNI*.—It was a bitterly cold day when I was at Wansford on May 14th, and, there being nothing on the wing, I turned my attention to a small bush of the common Buckthorn, which was only some two feet high and had but three little branches. On these I noticed three eggs of *G. rhamni* on the upper surface of a single leaf, and found five more eggs on the undersides of the leaves. This was probably too early a date for many eggs to have been laid, so on the 25th of the same month I searched several Buckthorn bushes in the watery meadows that are common near the Ouse in Brampton. On some eight or ten bushes I examined I found about 100 eggs, but not a single one of them on the upper sides of the leaves; the largest number on one leaf was seven, and next to it there were three on another leaf; but generally the eggs were laid singly, or at most in twos. They were deposited vertically on the leaves, at nearly a right angle, only a single egg being attached horizontally. They are green in colour, but turn orange shortly before hatching. They were all found on *Rhamnus catharticus*, the Alder Buckthorn (*R. frangula*) being probably now extinct in this county.—(Rev.) GILBERT H. RAYNOR, Brampton, Huntingdon, May 28th, 1928.

CURRENT NOTES AND SHORT NOTICES.

Our colleague Mr. R. S. Bagnall is asking for help on behalf of the forthcoming Monograph of the British Zoo- and Phyto-Cecidia, which he and Prof. J. W. H. Harrison, D.Sc., F.R.S., with Mr. Bartlett have been preparing for publication for some time past. They would like to have material sent them from all parts of the British Islands, with reprints of papers, any local records, and all information re the distribution of the galls. If these be all sent to Prof. J. W. H. Harrison at the Armstrong College, Newcastle-on-Tyne, they will be duly acknowledged. Material sent them will be identified and where necessary described and illustrated. There are many out-of-the-way districts from which no material has ever been received and would be gladly acknowledged. It will be remembered that the records of many species published some years ago in our pages were very meagre and from one or two localities only. Many of such must occur in other regions and when our readers are searching for larvae it would be little trouble to put all galls they meet with on one side for the furtherance of this work.

REVIEWS AND NOTICES OF BOOKS.

A revised HANDBOOK OF BRITISH LEPIDOPTERA, by Edward Meyrick, B.A., F.R.S., F.Z.S., F.E.S., published by Messrs. Watkins & Doncaster, price 18/-. This long-expected edition has at last been issued, but whether it can be considered as revised remains to be seen. When originally published it comprised 850 pages, the present issue contains 920 pages. "A few species have been suppressed for various reasons and about 100 added." The author says, "My views on classification have undergone considerable development especially in those groups commonly termed Micro-Lepidoptera, which have engaged my special

interest, the latter half of the book has therefore been entirely recast." However, the classification, the broad lines of which remain practically the same as in the original work, is based overwhelmingly on the one character of neururation only, *i.e.*, on a Linnean, mechanical, non-scientific arrangement, practically ignoring the results of the attempt to establish a natural system that has been in progress for a century at least, work based on characters obtained from all stages, by men like Herrich-Schaeffer, Guenée, Zeller, Dyar, Comstock, Chapman and many others. Often, as was pointed out by the critics of the former edition, species that have been associated by others on natural bases have been widely separated and those segregated into natural groups lumped together with disastrous results, even in their nomenclature.

As a case in point. One looks in vain for *Noctuae*, *Noctuidae*, these names are excluded from the book. We have in place *Caradrinidae*, of which family, we presume, for we are not told, that *Caradrina* is the typical genus. Let us look at this genus for a while as treated by the author. He places in it the following species, which have hitherto been separated into quite natural groups on characters apparent even to the "tyro":—*pyralina*, *diffinis*, *trapezina*, *subtusa*, *retusa*, *oo*, *paleacea*, *umbra* (*marginata*), *micacea*, *petasitis*, *lutosa*, *elymi*, *fulva*, *musculosa*, *phragmitidis*, *brevilinea*, *hellmanni*, *concolor* (*extrema*), *bondi* (*morrisi*), *arcuosa*, *palustris*, *quadripunctata*, *morpheus*, *alsines*, *taraxaci*, *ambigua*, *trigrammica* and *matura*: quite an omnibus genus. They are assembled because they all have glabrous eyes not ciliated on margins, middle and posterior tibiae not spinose, face without a horny plate, hindwings normal (veins not anastomosed), abdomen not crested, antennae seldom bipectinated with apex filiform, tibiae rough-scaled, tongue well developed, palpi moderate with terminal joint obtuse. All characters structural, mechanical, not a reference to life-history, genitalia, larval structure, ovum, etc., nothing natural, modern progress elbowed out, back to a Linnean-like classification.

This narrow-view arrangement leads to most incongruous assemblages of species in a genus. When one starts on elimination gymnastics, whether it be, of authors, publications, scientific facts, it is an easy matter to pose as being original or to reform, to reorganise. *Chrysophanus* contains *argiades*, *astrarche*, *dispar*, *phlaeas*, *minimus*, and *semiargus*, another mixed medley. In the Introduction we are told that the "earliest" name is used. We are sorry to definitely say this is not so, for even in the butterflies alone we instance *cydippe*, *megea*, *jurtina*, *hyperantus*, *medon*, *coridon*, *thetis*(?), *argus*(?), *croceus*, *flava* all of which should be substituted for those used in the book, as our readers can test for themselves by consulting the original author's use and spelling of the names.

The so called phylogenetic tables in the first edition are not now included which is perhaps well, based as they were on non-phylogenetic data.

Albeit, to quote the late Ld. Washington's remarks, "The book cannot fail to afford great assistance to the student who desires to recognise and identify his specimens without the necessity of comparing them with normal examples," so perfect concise, clear, and easy of comprehension is the mechanical perfection of the arrangement, as we have personally found in the micro-lepidoptera.

(To be concluded)

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—Several hundred species of Coleoptera (carded) from Hants and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Duplicates.—British Lepidoptera, many species.

Desiderata.—Back volumes of Trans. Ent. Soc. Lond., and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of christyi, abruptaria v. brunnea, black consonaria and bidentata, extensaria, curzoni, jasionata, venosata (Shetl.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. Herminia flavicrinaiis, Andreas, Nych. dalmatina race andreasaria, Warnecke, about 30 species of rare Acidalias; pupae of Eupithecia illuminata or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

Duplicates.—P. apollo nevadensis and rare Palaearctic Rhopalocera, also African Danaidae, Charaxes and Hypolimnas.

Desiderata.—Many rarer and few common species Rhopalocera. European only.—W. G. Pether, 4, Willowbridge Road, London, N.1.

Duplicates.—Fine bred prunaria grossulariata varieties and many other species.

Desiderata.—Ova of truncata and citrata.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—Strangalia aurulenta (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Bred Sparganii, Ochroleuca, Maritima, Straminea, and many other Noctuae.

Desiderata.—Pupae Carpophiaga.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially Carabus, sps., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytocecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 3rd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. June 14th, 28th. July 12th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W. 2.

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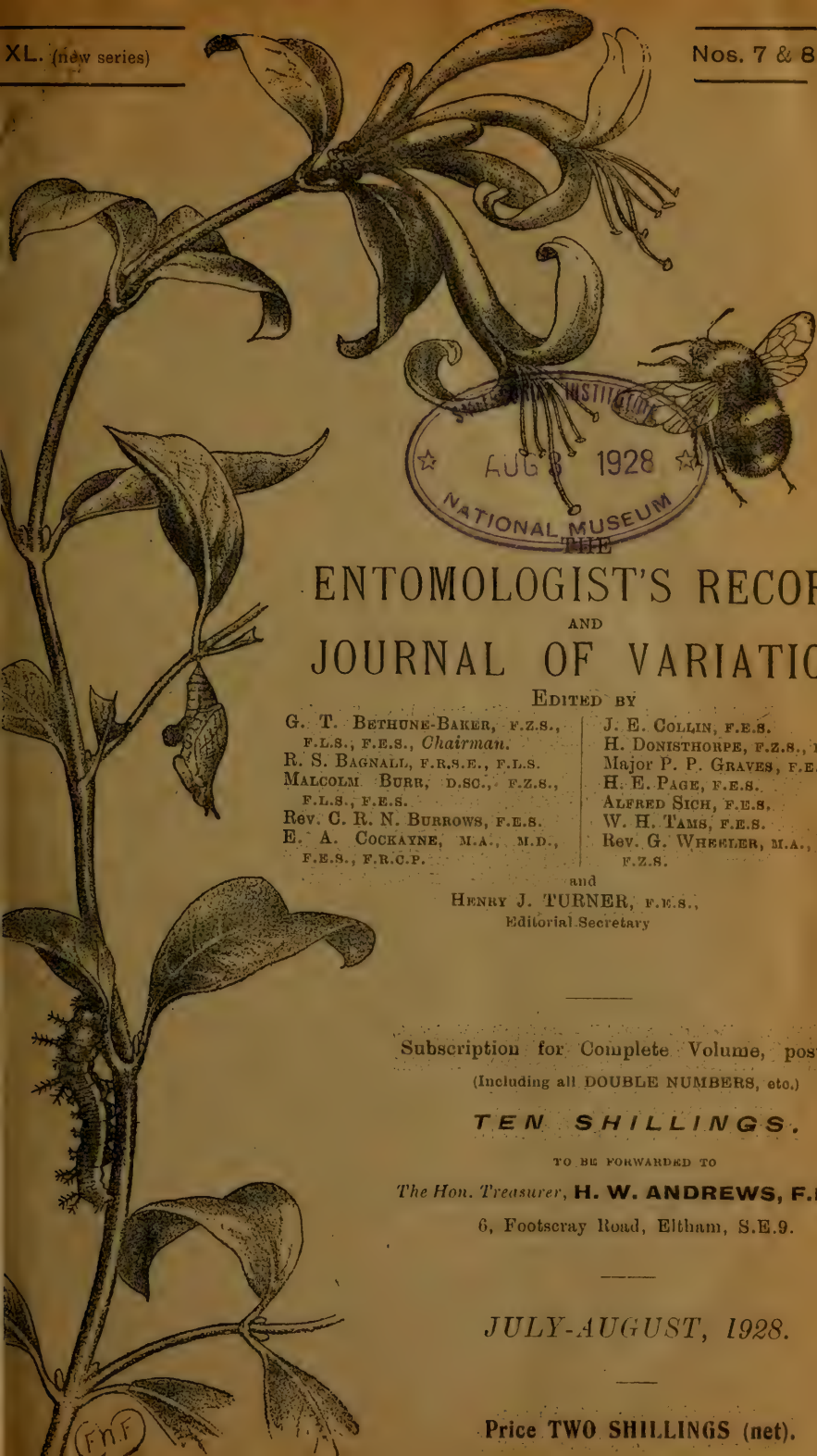
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An Essay on the Origins of the Geographical Variations of the Rhopalocera in Europe exemplified by *Melitaea aurinia*, Rott.

By ROGER VERITY, M.D.

(Concluded from page 91.)

To summarise, we are apparently ascertaining that species of Asiatic origin spread into Europe along three principal routes :

1. Through the Hyrcanian isthmus south of the Aralo-Caspian Sea, which opened early in the Miocene period. Two tracks then lay before them, both leading to the north-west of Africa : one along the south side of the Eastern Mediterranean, as it is still mapped out by the distribution of the little yellow *Euchloë charltonia*, Donz., from India to the Canary islands, and suggested by the remarkable existence of *Pyrameis indica*, Hbst., in these two extreme localities ; the other along the north side of that sea, through Asia Minor and the Aegean continent, which united it to Greece, and then on along the broad Greco-Tunisian isthmus, including Sicily and Malta (southern Italy did not exist) and indirectly united, during some time, also to Sardinia, when the latter was connected to Tunis. The continuity of this land is proved both by the fossils (the same elephants and hippopotami in the Pliocene formations of Crete and of Malta) and by the distribution of many living plants (cedars in the Lebanon and in Morocco) and animals (the Greek tortoise and the Painted-frog) ; Lepidoptera confirm it with the Arctiid genus *Ocnogyna*, with the existence in Sicily of the oriental *Anthocharis damone*, *Powellia orbifer* and other species, of *Papilio alexanor* in southern Calabria, of *Melitaea aetherie*, Hüb., in Sicily and in Andalusia, etc. These two tracks can be considered practically as parts of the same principal route from Persia to Morocco. Thence the invasion went on through the Iberic isthmus and probably later, as we will see, also into the Tyrrhenian one, when, in early Pliocene times, it rose as a huge reef connecting to Africa the pre-existent islands of Corsica and Sardinia and possibly these to Piedmont, and before it was again cut off at the south of Sardinia and greatly reduced in the Middle Pliocene epoch. Some naturalists maintain that Corsica was not united to Piedmont at that time, and this view is probably correct, but the paucity of Alpine plants and animals common to the Maritime Alps and the two islands is no proof of it, if, as we suppose, they reached the Alps much later, during and after the Pleistocene ; as far as I have made out, those that do exist in the islands also exist in Anterior Asia, showing they no doubt reached them with the moufflon migration, from the south. A far better proof is afforded by the very distinct species and exerges peculiar to those islands, because one can apparently trace the origin of some to the particular Asiatic region of the Himalaya, so that they must have reached the islands when they were connected to the mainland southward, and it stands to reason they would have proceeded on to Piedmont had they found the way open. Corsica, instead, must at that time have been connected to Sardinia, or the quadrupeds and the wingless *Orgyia* could not have reached it ; if it is established that a few species exist in one and not in the other it is no proof of an early, definitive, isolation of Corsica, because climatic and orographic conditions can

perfectly well have, since, led them to extinction in Sardinia and vice versa. The mountain sheep, which had been coming over from the rising Himalayas during the temperate Miocene interval, were in time to avail themselves of the connection between Africa and Sardinia, which formed during a short period of the Early Pliocene, as stated above, and to take refuge in the mountains of that island and of Corsica, as did their congeners in those of Cyprus and of Asia Minor, just before the last wave of tropical heat, during which the tropical African fauna took the upper hand again and flourished for the last time in the Mediterranean region (Pontian fauna). What interests us here is that with the sheep must have come *Papilio hospiton*, G  n  , its close relationship with the Himalayan *sikkimensis*, Moore, thus being explained, and *Argynnis elisa*, God., which also has its nearest relative in the Himalayan *clara*, Blanch. *Nytha neomiris*, God., may have been their companion too, but its existence with *corinna* in the isle of Elba casts a doubt on this conclusion. *Coenonympha corinna*, Hb., certainly seems to have originated locally from some eastern source, just as *C. dorus*, Esp., did further west. *Epinephela nurag*, Gbil., likewise seems to have originated locally in the same way that *jurtina*, L., probably originated in the west from an ancestor similar to *jantroides*, H.S., and *telmissia*, Z., in the east. It is worthy of consideration that the Asiatic species and exerges in Sardinia and Corsica should be closely related to Himalayan ones and that the time at which they must have reached those islands, during their temporary connection with Africa, should exactly coincide with that which followed the culminating uplift of those mountains. One can scarcely doubt that these telluric phenomena have caused a special flow of the inhabitants of that particular region towards the west, favoured by the increase of the land outlet in that direction, whilst for long ages of the secondary epoch it had been isolated even from Central Asia by the eastern branch of the Thetys Sea, so that it had produced a peculiar fauna. At the end of the Miocene and early in the Pliocene there has been, besides, a period of cold climate, during which mountain species descended at quite low altitudes and many evidently passed at that time along the Elburz Mts. into Anterior Asia. Groum Grsheim  lo (*Romanoff's M  m. sur les L  pidopt.*, IV. (1890) has made an interesting study of the different centres of origin of various groups of species in Central Asia. In my article for the *Annales Soc. Ent. de France* I have endeavoured to develop this subject still further and I have pointed out that Groum's general inductions were not correct, because he was misled by the preconception that most Palaearctic species and genera had originated in the Pamir.

The "Africo-Iberic" route is extremely interesting, because it seems to afford actual examples of the origin of local species, like small "satellites," from colonies of broadspread ones, which remained cut off in the extreme west by periods of aridity in North Africa, whilst most species in the same conditions only went as far as producing a very distinct exerge. These constitute that special Ibero-African fauna, which has spread as far as southern France. Here they met with the hordes, which had spread north of the Mediterranean, so that either in Spain or somewhere in the zone from the Pyrenees to the Valais (exceptionally even further east, like *M. dejone*, H.G., in the Tyrol) they came in contact again with their own species or with their

mother species or with their nearest ally. In the first instance some of the striking cases of exergism were produced, which have given rise to so many discussions as to specific distinctness.

2. Through the same isthmus as the former, south of the Caspian, and then along the great belt of land which included Asia Minor and the greater part of the Balkans of to-day and which ended in a point joining on to Southern Piedmont. This "Aegeo-Dinaric" route was closed on the north side by the Black Sea and by the great stretch of saline morasses of the Danube basin, left behind by the former as it retracted from it; further west the Eastern Alps completed the barrier, so that Central Europe could not be reached that way until comparatively recent times. There is evidence that it has then been rather the fauna of Central Europe which passed southward into the Balkans than the Aegean one northward, presumably owing to the climate, unsuited to the latter, as well as to the fact that any new push from Asia had then been practically abolished by the formation of the Aegean sea. The fossil species of the Eastern Asiatic palaeartic genus *Lühdorfia* (wrongly thought at first to be a *Doritis*), discovered in Miocene formations near Pisa, is very instructive in connection with this route, considering fossil butterflies of the Cretaceous series from the sandstone of Aix-la-Chapelle and of the Lower Miocene beds of Croatia belong to most highly tropical genera. It shows that, after the southern connection between Anterior Asia and Central Asia was established, early in Miocene times, arrivals from Asia soon spread as far as the end of the great belt of land, which connected Asia Minor to Piedmont and which in previous ages (Lower Cretaceous) had reached Corsica and Sardinia, and that those arrivals already had palaeartic features. It suggests the arrival at that early period of the group of animals now existing in this region and having obviously originated together with similar ones existing in North America, such as *Papilio alexanor*, Esp. Harrison supposes them to have migrated from the N.-E. of Asia in much more recent times, after the Pleistocene glaciations, but in some cases, like *alexanor*, the fact that no representatives have now survived in the intermediate Asiatic regions could be better explained by a more ancient passage through the latter, followed by the great changes these have undergone since the Miocene period. Nothing, in the way of migrations, surprises one any more after the conclusion one is apparently bound to come to, by a multitude of facts of all sorts ("north polar theory" of Wallace), that the original stem of most of the palaeartic genera was evolved on a great continent once stretching, with a temperate climate, (whilst tropical conditions prevailed on most continents), far to the north and from north-eastern Asia to north-western America, and that, driven out of that region by the arctic climate, which set in there, they actually migrated in a few cases, in Secondary and early Tertiary ages, according to Wallace, as far as New Zealand and the temperate regions of South America (*Erebia*, *Chrysophanus*, *Colias*, *Argynnis*, etc.).

3. Across the northern branch of the Tethys Sea, when it had dried up to a considerable extent and broken, north of the part which remained as the Aralo-Caspian Sea, and thence through the broadening passage between the retracting Scandinavian ice-sheet and the latter sea, which is known to have conferred to central Russia, at certain times, a milder maritime climate than it has nowadays, and on into

Central Europe. Presumably all the living species and exerges which came by this "Northern Siberio-Russian" route are comparatively recent immigrants, because that part of the Thetys Channel was the last to disappear and because Northern and Central Europe were so swept by the ice sheet during the Pleistocene period of glaciation, three or four times over, that all pre-existent butterfly-life must have been entirely banished from them. A few species, however, which had arrived early, no doubt survived, at least the minor glaciations, by retreating southward into southern Russia and the Balkans and, in fact, they have left representatives as far south as Dalmatia (*Apatura iris*, *M. maturna*, etc.). I have already mentioned in connection with the alpine *glacigenita* of *M. aurinia* that the most reasonable explanation one can give of the existence of exactly the same alpine species and exerges, from the chamois to the edelweiss, not to speak of the numerous butterflies, in the Alps of Europe and in the Altai and other mountain chains of West Siberia is that they must have passed during certain periods of climate to which they were suited, across the countries stretching between these mountains, when other species and other exerges of the same species were driven away by the cold. It appears to me that a glance at the maps showing the maximum extension of the Scandinavian ice-sheet is impressively favourable to this conclusion, because the outline of the latter exactly leads from what was, at the time the ice existed, the gateway of Europe, around the northern shores of the Aralo-Caspian Sea, to very near the enormous glaciers of the Alps of those days. No conditions could have been more conducive to a comparatively rapid invasion, along the outskirts of the ice, by those organisms which still live in the same sort of surroundings near the small glaciers of the present day. Besides acting as a route for Asiatic invaders of this kind, those grounds may have been an excellent outlet and refuge for inhabitants of the Alps of Europe previous to the Pleistocene glacial periods, such as Harrison supposes *Nyssia alpina*, Sulzer, to have been, but it does not seem that many thoroughly glacial species or exerges have reached them, or developed there, between their comparatively recent formation and the time, when the Scandinavian ices brought, on their outskirts, organisms, which had evolved in this sense, during countless ages, in other lands. The genus *Erebia* is the one which affords most exceptions, as several species are evidently of European origin and have acquired their present features since the time when the genus arrived for the first time by the Aegean route, during the Miocene: some, in fact, have responded so quickly to the new surroundings, they successively met with, that in the west they have in some cases differentiated into distinct species either entirely representative of more eastern ones or associated with them: for instance, *epistygne* of *goante*, *neoridas* of *pronoë*, *scipio* of *alecto*, Hüb., figs. 515-6 = *nerine*, Freyer, *lefebvrei* of *melas*, *gorgone* of *gorgé*, *gorgophone* of *mnestra*, *palarica* of *stygne*. This duplication has taken place in so many species of this genus and always in the very area, between central Spain and the Western Alps, in which the Africo-Iberic exerges and satellite species of other genera have met again with their mother exerge or species, that one feels strongly induced to ascribe them to the same causes. The fact that the western species have left no trace of their passage along the Africo-Iberic route, as usual in other genera,

could be explained by the particular intolerance of heat and aridity of the *Erebia* and the lack on that route of sufficiently large mountain masses, well watered by glaciers and springs, to serve as refuges during the periods of tropical heat of the Pliocene, at such a southern latitude. If *Plebeius lycidas*, Meigen (not Trapp), had not survived to this day on the Sierra Nevada and in Central Spain and if it had not been accompanied to the Simplon by *Melitaea dejone*, one would probably never have suspected it had reached it by the long Africo-Iberic route and its position would be similar to that of some of the *Erebia* in question. There is also the example of *L. dardanus*, H.S., a high-mountain species, which has, notwithstanding, certainly reached the Pyrenees from the south (recorded from the Sierra Nevada) and met there with its mother species *glandon*, Pr., = *orbitulus*, auct., from the Alps. *E. tyndarus* in the Sierra Nevada must be a recent Pleistocene immigrant from the North, as Chapman has found its genitalia are like those of nymotypical *tyndarus*, whilst in *ottomana*, H.S., of the Balkans they are very different. Apart from this remarkable genus, most of the European alpine species and exerges are Asiatic immigrants and the theory that they have been conveyed from one ice-sheet to the other seems to be sustained by the fact that all the species, which, in the Alps, are strictly confined to very high altitudes and usually to the close proximity of glaciers, have not passed on to the Pyrenees (*H. cacaliae*, *A. orbitulus* = *pheretes*, auct., *P. phoebus*, *P. pluto* = *glacialis*, *O. ello*, *M. asteria*); presumably those two ice-sheets never came sufficiently near to each other for these species to pass from one to the other at that latitude.

Lycaena.

By P. P. GRAVES F.E.S.

There is another side to the question of the genotype of *Lycaena* which is not touched in the paper entitled "*Lycaena*," *Ent. Rec.* pp. 33, 34, vol. xl.

The designation of a type species of a genus is governed by rules, revised at the International Zoological Congress of 1913, by a representative international body. (Proc. Int. Zool. Cong. 1913, Nomenclature, Rules, Art. 30.) These rules are contained in the above-mentioned article. They are numbered *a-g* and are to be applied in that order of precedence.

These rules may be applied as follows to the case in question, *viz.*:—the genotype of the genus *Lycaena*.

In the original publication of the genus *Lycaena* (Fab. 1807) no species was definitely designated as type.

No species of *Lycaena* was called *typicus* or *typus* and the genus was not monotypical and indeed contained 150 species. None of its species possessed the generic name as a specific name, *i.e.*, there was no *Lycaena lycaena* so there was no type by absolute tautonymy. In this connection it should be noted that the last paragraph of Article 30 says that the mere mention of a species as an illustration or as an example of a genus does not constitute a "selection" of a type because the expression "selection of a type" must "be rigidly construed."

It follows therefore that the method of fixing the type of the genus

Lycaena or of any other genus by exclusion or restriction which is what Thon, Latreille and Oken are alleged to have done is not accepted by the rules of the XIth International Zoological Congress.

Incidentally it may be noted that the importance of Oken's action in giving the name *Lycaena* mainly to the "blues" seems to be exaggerated since he included so typical a "copper" as *thersamon* in *Lycaena*.

The first definite designation of a type of the genus *Lycaena* was made by Curtis in 1824. In this connection it would be interesting to know whether the expression "type" or "typical species" of a genus was used of any species by any Lepidopterist before Curtis and by whom.

Thon fixed and settled nothing. He gave a summary of the history of the classification of the "Papiliones" quoting the various arrangements of preceding authors. Thus he quotes Ochsenheimer, remarking that he "has the following genera: *Melitaea* (*P. maturna*) *Lycaena* (*P. arion*).". This is merely a citation of Ochsenheimer in whose genus *Lycaena* the species *L. arion* happened to come first. In quoting Stephens, Thon says "he set up the following families and genera 3rd Family, *Lycaenides*, Leach. *Thecla*, Fab. (*betulae*) *Lycaena*, Fab. (*chryseis*).

The conclusions to which one is forced by the above facts and rules are these.

1. If the first definite designation of a type overrides the "law of the first reviser" then *phlaeas* is the type of *Lycaena*. If the validity of the Law of the first reviser is recognised and if it is applicable in this case then one of Latreille's species must be the type of *Lycaena*.

But the "law of the first reviser" is not recognised by the IXth International Congress. Therefore *phlaeas* is the type of the genus *Lycaena* by definite designation "regardless of any other consideration" under Art. 30, I. a.

2. *arion* was fixed as the type of *Lycaena* not by Thon in 1838 but by Tutt, who mistook Thon's citation of an example of a genus for a fixation of the genotype.

PRACTICAL APPLICATION. If *Lycaena* must go it is possible that *Maculinea* (genotype *alcon*) set up by van Eecke, *Zool. Med.*, Vol. 1, p. 28, in 1915, may cover *arion* which is generally held to be of the same genus as *alcon*. But if for good and obvious reasons of convenience it is desired to preserve the present use of *Lycaena* machinery can be put in motion with the object of causing it to be declared a *nomen conservandum*.

[The International Rules of Nomenclature were drawn up after 13 years discussion, in 1905, very largely based on the necessary principle of priority. They were extensively circulated, printed in French, English and German. Under these rules Nomenclature was very considerably changed with, it was hoped, an approach to stabilisation. Recommendations have been proposed since at various times to add to these rules. The great error made at the 1913 Int. Zool. Congress was, that the recommendations of new basic principles there made, should have been made retrospective since it caused further drastic and very extensive re-alterations and re-changing of names, if they were carried out. These 1913 alterations in the rules were not circulated, and but very few entomologists observed them, or even knew of their

existence, until a few enthusiastic and keen workers raked them up from their oblivion. So bad is their incidence in entomology that it appears that the alterations needed under them will be more numerous and revolutionary than these necessitated by the priority rules. In the interests of our beloved study entomologists should take this up on their own and not be governed by the further interference from outside by a body whose purview of natural objects is far from the almost illimitable purview of entomologists.—Hy.J.T.]

Descriptions of New Species of Noctuidae.

By A. E. WILEMAN, F.E.S. and R. J. WEST.

Collected by A. E. Wileman in the Philippine Islands, the types being in the Wileman collection. "Ridgway" has been used as the standard for colours. Colour terms in *italics* are not Ridgway's. Patagium = collar-tippet. Tegula = wing-base-cover.

AGROTINAE.

Euxoa luzonensis, sp. n.

Male.—Palpus drab and fuscous mixed, second segment fringed with hair-like scales, third segment small, smoothly scaled. Antenna: shaft fuscous, pectinated, pectinations ciliated. Head: frons and vertex drab and fuscous mixed. Thorax hair brown, patagium hair brown, bordered with pale drab grey posteriorly, tegula clothed with long hair-scales of hair brown and pale drab grey mixed. Abdomen drab, with hair-scales forming dorsal crest on basal segment, venter drab grey, anal tuft drab grey tinged with tawny. Pectus thickly covered with drab hairs. Legs fuscous, ringed with drab grey at joints of tarsal segments, all tibiae spined. Fore wing drab grey dusted with fuscous, the markings being formed by the fuscous predominating at the following points:—orbicular and reniform, antemedial fascia consisting of two parallel wavy lines, postmedial with an outward curve from costa to vein 2, then slight outward curve to inner margin, subterminal fascia wavy; termen fuscous, cilia drab grey; some clay colour around orbicular and reniform, and a clay coloured streak below basal half of cell. Underside fuscous, with hairs in cell, some pale drab grey scales along costa and termen forming a greyish band. Hind wing upperside drab grey, termen fuscous, cilia drab grey. Underside drab grey, with a faint fuscous spot on discocellulars, and a faintly marked subterminal band.

Expanse 42 mm. (Tip to tip 39 mm.)

Female.—Similar but differing from male in having antenna ciliated, with paired setae.

Expanse 38 mm. (Tip to tip 37 mm.)

Holotype. Male. Haight's Place, Pauai, subprov. Benguet, Luzon.
7,000 ft. 14.XI.1912.

Allotype. Female. " " " " " 7,000 ft. " 11.XI.1912.

Paratype. Male. " " " " " 7,000 ft. " 11.XI.1912.

Paratype. Male. " " " " " 7,000 ft. " 7.XI.1912.

Paratype. Female. " " " " " 7,000 ft. " 25.VI.1913.

This species is near *E. intracta*, Wlk., which has not the grey or yellow scaling on forewing.

Male.—Palpus warm buff and fuscous tinged with Hay's russet, second segment thickly scaled, third segment small. Antenna, ciliated with paired setae. Head: frons and vertex Hay's russet and pale drab grey mixed. Thorax Hay's russet, patagium pale drab grey anteriorly, overlapping Hay's russet posteriorly, in this overlap the grey is tinged with Hay's russet; tegula Hay's russet. Abdomen drab, venter drab grey tinged with Hay's russet; anal tuft clay colour. Pectus drab grey tinged with Hay's russet. Legs: coxae, femora, and tibiae drab with Hay's russet hair-scales, tarsal segment fuscous, joints drab grey, all tibiae spined. Fore-wing ground colour pale drab grey, suffused with Hay's russet between ante- and post-medial fasciae, orbicular amplified into a large, pale drab grey patch thrown into relief by patch of velvety, warm, blackish brown bordering its lower half in the distal half of the cell; reniform ill-defined; a patch of fuscous below basal half of cell, sub-basal fascia Hay's russet edged with fuscous black half way across the wing, antemedially a thin grey line edged with Hay's russet; postmedially two broken lines curved outwardly, the inner line made up of small disconnected lunules of Hay's russet between the veins, the outer line consisting of fuscous dots or points on the veins; subterminal fascia Hay's russet and fuscous mixed, wavy, and consisting of a series of short sagittate marks (points basad); termen fuscous, cilia drab. Underside drab grey, with a patch of hair-scales in distal half of cell, and faint drab postmedial line. Hind wing upperside cartridge buff tinged with fuscous; underside cartridge buff with scattered drab scales below costa, a small fuscous patch on discocellulars, and faint line post-medially from costa to vein 4.

Holotype. Male. Haight's Place, Pauai, subprov. Benguet, Luzon.
7,000 ft. 5.XII.1912.

Paratype: Male. " " " " " " " " 12.I.1912.

This species is near *A. c-nigrum*, Linn., but differs in colouring, the shape of orbicular, and in the less clearly defined reniform stigma.

Male.—Palpus: first and second segments thickly scaled with fuscous, third segment cinnamon buff, junction of second and third segments cinnamon buff. Antenna shaft fuscous, basal fifth cinnamon buff, fasciculate. Head: frons and vertex cinnamon buff. Thorax: patagium cinnamon buff with fuscous anteriorly, tegula cinnamon buff. Abdomen drab above and beneath, with dorsal crest of hair, anal tuft cinnamon buff. Pectus cinnamon buff. Legs fuscous with cinnamon buff at junction of tarsal segments; all tibiae spined. Forewing cinnamon buff dusted over with hazel, hazel along costa; sub-basal fascia oblique, not well defined, hazel with a few

pallid mouse grey scales at costa, pallid mouse grey and fuscous patch below median nervure; antemedial fascia wavy, scantily edged with fuscous, and a little pallid mouse grey at costa, claviform paler than ground-colour, with a few fuscous scales distally; orbicular cinnamon buff outlined with hazel, reniform cinnamon buff with fuscous spot between two white spots near lower edge, outlined with hazel; an indistinct medial fascia curved outwardly, touching, and indented by the reniform: postmedial fascia cinnamon buff outlined with hazel, outwardly curved to vein 7, then slightly excurved to inner margin; subterminal fascia cinnamon buff edged with hazel and fuscous, angled near apex, then slightly curving to inner margin, cilia cinnamon buff and hazel mixed; underside drab. Hindwing upperside drab, underside drab with faint fuscous postmedial band, and lunule on discocellulars.

Expanse 34 mm. (Tip to tip 33mm.)

Female.—Antenna, ciliated, with paired setae. Forewing hazel dusted over with pallid mouse grey, markings similar to male, but not so conspicuous.

Expanse 40mm. (Tip to tip 38mm.)

Holotype. Male. Haight's Place, Pauai, subprov. Benguet, Luzon.
7,000 ft. 9.XI.1912.

Allotype. Female. " " " " " " 30.XI.1912.

Paratype. Male. " " " " " " 5.XI.1912.

Paratype. Female. " " " " " " 30.XI.1912.

Paratype. Female. " " " " " " 9.XI.1912.

This species is very close to *E. gaudens*, Hmpsnn., but is much larger.

Lepidoptera of a Gloucester Garden.

By G. F. BIRD.

Naturally enough most entomological notes relate to rural localities. Feeling, however, that records from urban districts are not without interest I venture to send an account of the Macro-lepidoptera observed in a Gloucester garden during a 3½ years' residence in that city from September, 1923, to March, 1927. Although situated within the bounds of the city it should be mentioned that the garden adjoins a playing-field beyond which are allotments, so is in a fairly open situation. In the list of insects that follows some of the earliest and latest dates of appearance have been inserted.

RHOPALOCERA.—*Pieris brassicae*, 1st brood, 6.v.26; 2nd brood, 11.vii.25; *P. rapae*, 1st brood, 2.iv.26; 2nd brood, 10.vii.25; *P. napi*, 1st brood, 28.v.24; 2nd brood, 14.vii.24; *Euchloe cardamines*, once; *Gonepteryx rhamni*, once; *Polyommatus icarus*, 10.ix.26; *Polygonia c-album*, hyb., 8.iv.25; 1st brood, 13.vii.25 and 26; 2nd brood, 9.ix.26; *Aglais urticae*, hyb., 2.iv.26; *Vanessa io*, hyb., 15.iii.24; *Pyrameis atalanta*, hyb., 20.vi.24; fresh brood, 30.vii.25; *Epinephela jurtina*, *Coenonympha pamphilus*.

HETEROCERA.—*Smerinthus ocellatus*, once, 18.vi.26; *Amorpha populi*, 15.v.25, 22.vii.25; *Mimas tiliae*, once, 17.vi.26; *Hepialus lupulinus*; *H. humuli*, earliest date, 26.v.24. but a freshly vacated pupa-case found 24.v.24; latest date, 2.viii.26, a ♀; *Nola cucullatella*, 27.vi.24; *Lithosia lurideola*, once, 17.viii.24; *Hipocrita jacobaeae*; *Arctia carya*, larvae; *Diacrisia mendica*, once, 24.v.26, a ♀ flying in the daytime; *Spilosoma lubricipeda*, latest record, 3.viii.26; *S. menthastri*; *Porthesia phaeorrhoea* (*chrysorrhoea*), 4.vii.25; *Orgyia antiqua*, 22.vii.25; 20.ix.23; *Malacosoma* (*Chsiocampa*) *neustria*, larvae; also a ring of ova on a raspberry cane; *Cilix glaucata* (*spinula*), 8.vi.25; *Pterostoma palpina*, once, 26.vi.24; *Pygaera bucephala*, larvae, and a ♂ “sembled,” 9.vi.25; *Gonophora pyritoides* (*derasa*), 12.vii.25; *Acrionicta megacephala*, once, 23.vii.25; *A. psi*, 28.iv.26; 13.vii.25; *Phaetrea rumicis*, larvae found, 28.ix.24; *Agrotis segetum*, bred, 4.vi.26; wild, 14.vi.26; *A. puta*, 1st brood, 2.vi.24; 2nd brood, 31.vii.26; *A. exclamatoris*; *A. nigricans*, 2.viii.25; *A. tritici*, 30.vii.26; *Triphaena orbana*, 2.vii.25; *T. pronuba*; *Noctua augur*, 13.vii.25; *N. plecta*, 14.vi.26; *N. e-nigrum*, 13.vii.25; *N. rubi*, 1st brood, 14.vi.26; 2nd brood, 3.viii.26; *N. xanthographa*, 1.viii.25; *Hadena dissimilis*, 1st brood, 9.vi.24; 2nd brood, 11.viii.26; *H. oleracea*, 14.vi.26; *H. dentina*, 10.vi.25; *H. trifolii*, 1st brood, 25.v.24; 2nd brood, 13.vii.25; *Mamestra brassicae*, 1st brood, 30.v.25; 2nd brood, 14.viii.24; *M. persicariae*, larvae; *M. sordida*, once, 14.vi.25; *Hecatera serena*, once, 21.vi.26; *Dianthorecia capsicola*, larvae; *Xylophasia lithorylea*, 28.vi.26; *X. monoglypha*, 29.vi.24; *X. rurea*, ab. *combusta*, once, 18.vi.26; *Apamea basilinea*, once, 30.v.25; *A. gemina*, once, 18.vii.24; *A. secalis*, 12.vii.26; *Miana strigilis*, 24.vi.26; *M. furuncula*, 20.vii.24; *Euplexia lucipara*, 17.vi.25; *Phlogophora meticulosa*, 17.v.25; 19.vii.24; 7.ix.26; *Leucania impura*, 16.vii.26; *L. pallens*, 1.viii.26; *L. conigera*, 19.vii.26; *L. lithargyria*, 18.vii.26; *Taeniocampa gothica*, 15.v.25; 1.vi.25; *T. stabilis*, larva; *Mania maura*, 5.viii.24; *Naenia typica*, 24.vi.25; *Amphipyra tragopogonis*, 23.vii.25; *Caradrina morpheus*, 24.vi.24; *C. alsines*, 3.vii.24, bred from larva; *C. cubicularis*, 9.vi.25; *Grammesia trilinea*, once, 15.vi.25; *Calymnia trapezina*, once, 30.vii.26; *C. affinis*, 1.viii.25; *Amathes circellaris*, 7.x.26; *A. pistacina*, 4.x.26; *Cucullia umbratica*, 9.vii.26; *Pulsia chrysitis*, 17.vi.25; *P. moneta*, 24.vi.26; *P. pulchra*, 20.vi.26; *P. iota*, 19.vi.25; *P. gamma*, im., 9.vi.25; fresh brood, 19.vii.25; 4.x.26; *Abrostola tripartita*, 31.viii.24; *A. triplasia*, 21.vi.26; 15.vii.26; 6.viii.24; *Bryophila perla*, 2.vii.26; *Gonoptera libatrix*, hyb., flying in garden, 25.v.26; *Catocala nupta*, 24.viii.26; *Zanclognatha tarsipennalis*, 8.vii.26; *Hyppena proboscidalis*, 16.vi.26; *Pseudoterpnina pruinata*, once, 24.vii.25; *Hemithea aestivaria*, 29.vi.25; *Calothyrsaris amata*, 10.vii.26; *Sterrhia dimidiata*, 24.vi.25; *S. seriata*, (*virgularia*), 18.vi.25; 4.viii.25; 27.ix.23; *S. aversata*, 22.vi.25; *Ortholitha bipunctaria*, once, 31.vii.24; *Operophtera brumata*, 11.xii.25; *Triphosa dubitata*, 7.viii.26; *Calocalpe cervicalis*, 12.v.24; *Lygria mellinata* (*associata*), 28.vi.25; *Cidaria bicolorata*, 27.vi.25; *Chloroclysta niata*, 16.ix.23; *Dysstroma truncata*, 26.v.26; 26.viii.26; 13.ix.24; *Xanthorhoe fluctuata*, 27.iv.26; 6.x.26; *X. montanata*, 12.vi.26; *X. spadicearia* (*ferrugata*), 1.viii.25; *X. ferrugata* (*unidentaria*), 20.v.24; 5.vi.26; 18.vii.25; 6.viii.24; *Euphyia bilineata*, 23.vi.24; *Eupithecia centaureata*, 18.vii.24; 6.viii.25; *E. assimidata*, 22.vi.24; 12.viii.24; *E. vulgata*, 23.iv.26; *E. subnotata*, 20.vii.26; *E. innotata* r. *fraxinata*, once, 11.vi.25; *Horisme tersata*, once, 27.vi.24; *Abraaxas grossulariata*, 9.vi.25; *Lomaspilis mar-*

ginata, 20.vi.25; *Bapta temerata*, 30.vi.25; *Cabera pusaria*, 5.viii.25; *C. exanthemaria*, 11.viii.26; *Selenia bilunaria* r. *illunaria*, 2.viii.24; *Crocallis elingaria*, 1.viii.26; *Ourapteryx sambucaria*, 23.vi.25; *Opisthograptis luteolata*, 17.v.26; 25.viii.24; *Erannis defoliaria*, 5.i.26; *Phigalia pedaria*, one (!) larva on lime, 7.vi.25; *Biston betularia*, bred, 16.v.26; *Hemerophila abruptaria*, 25.iv.26; *Boarmia rhomboidaria*, 12.vi.26; *Itame wanaria*, 6.vii.26.

The only other "macros" noticed within the city, and not recorded in my garden, were: *Lycænopsis (Celastrina) argiolus*, 13 iv.26, seen flying along the busiest main-street in Gloucester, at the Cross, and *Dasychira pudibunda*, one larva observed crawling up the front wall of a house in a road of small semi-detached villas.

Some further notes on a few of the insects mentioned above may be worth recording:—

Polygonia c-album.—By no means common, but an annual visitor to my garden. From the many recent records this interesting butterfly appears to be re-establishing itself in many parts of England. I, myself, have met with it in a few localities in the neighbourhood of Gloucester and have had the pleasure of seeing it in my present garden at Churchdown.

Amorpha populi.—A number of these, freshly emerged, were found in May, 1925, clinging to various garden plants in the vicinity of a large White Poplar (*Populus alba*), and one or two also on the trunk a foot or two from the ground. A few, also, were netted at dusk while flying near this tree, the last, a worn ♀, on July 22nd. The first specimen, found on May 15th, hanging to a Solomon's Seal, is a very small ♂ measuring only $2\frac{3}{8}$ inches from tip to tip.

Malacosoma (Clistocampa) neustria.—In 1926, I found a large nest of the larvae on an apple tree. They collected in a mass at the fork of the two main branches, about a yard from the ground, where they spun a pad of web on the bark. Here they completed their final moult, after which the larvae dispersed to various parts of the garden and were found feeding on other trees, etc., some a considerable distance away from where they had passed the gregarious period of their larval life. I regret now that I did not take more of these larvae as I bred two splendid dark chocolate ♀'s from the very few that I kept; one in particular is practically unicolorous.

Hadena trifolii.—Common, especially the ♀'s. When compared with a series taken in the London district, at Hammersmith, the Gloucester specimens appear to be greyer, that is to say, less warm in tone.

Sterrhia seriata (virgularia).—A melanic specimen was found on a paling on July 27th, 1924. I have previously only taken this form in Hammersmith.

Eupithecia innotata r. *fraxinata*.—One, which had probably been attracted by light, was taken at rest on a ceiling in the house on June 11th, 1925. The specimen is considerably larger than any in our series from Hammersmith.

Ourapteryx sambucaria.—Having previously only taken ♂ specimens of the ab. *cuspidaria* I imagined that this variation might be confined to that sex, but on June 21st, 1924, my wife captured a fine ♀ specimen of this aberration in the garden, and I netted another example on July 13th, 1926.

Itame wauaria.—On July 6th, 1926, one of my sons caught a melanic specimen, all the wings being suffused with black scales.

To conclude: In Gloucester I found treacling and ivy-blossom quite unproductive, and few insects came to light, but at dusk, and later in the evening, *Buddleia variabilis* and *Centranthus ruber* were very attractive. At *Buddleia* I netted *Agrotis tritici* and *A. nigricans*, several of each in 1926; *Hadena trifolii*; *H. dissimilis*, once attracted to the flowers at 9.45 a.m. (G.M.T.), during bright sunshine. With regard to this occurrence it may be worth recording that there was thunder later in the afternoon; *Lencania pallens*; *L. conigera*; *L. lithargyria*; *Agrotis segetum*; *Plusia gamma*; *Triphosa dubitata*; etc.; while moths taken at *C. ruber* include *Plusia chrysitis*; *P. moneta*; *P. iota*; *Abrostola triplasia*; *Agrotis exclamationis*; *Hecatera serena*; and *Cucullia umbratica*. Sweet William was also attractive especially to the *Plusiidae*, and at this flower I netted *P. pulchrina*, which, however, was scarce.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

VII. THE WATERSHED.

The highlands of the interior of Angola, which form an extensive plateau between 3000 and 4000 ft. high, and are mostly covered with forest and scrub of varying density growing out of dry, loose sand, are cut by a number of streams, usually with clear and rapid water, edged with strips of bog and grass. These streams run in a herring-bone pattern, and cut the country into a series of roughly parallel ridges, usually flat-topped, with gentle sloping sides.

We have trekked some way down one of these rivers, the Luena, which runs into the Zambesi, followed some of its feeders, and some of those which supply the Lumeje, which in its turn joins the Luena lower down, so that all the waters of these rivers drain out into the Indian Ocean.

About twenty miles north of our headquarters at Villa Luso, which is the administrative centre of the District of Moxico, there is one ridge, seemingly no higher and certainly narrower than most of the others, which plays a very important part in African geography, for it is the watershed between the systems of the two great rivers Zambesi and the Congo.

On June 10th, we set out to have a look at this country. About eight miles through the forest, on the road which leads to the Congo frontier, we struck the valley of the Lumeje, and here the forest seems to have more life than down the upper part of the Luena. We had hitherto been struck by the poverty of bird life, and so were glad here, during the day and night we were camped by the river, to see nineteen different species. The air seemed alive with them, and they were having the time of their lives, for an ant's nest in the ground was pouring fourth clouds of winged colonists, which flew feebly into the air and provided a splendid feed for the birds. The kinds which were taking full advantage of the opportunity were a brilliant glossy green starling, a beautiful bee-eater, perhaps the identical species, which

I have so often admired in the Caucasus and in Macedonia, for *Merops apiaster* occurs in Angola, a black and white butcher bird, two kinds of swallow, one with white, the other with red belly, a bunting, and two kinds of thrush; none of these seemed unfamiliar in their appearance; strange to us was an all-black bird that behaved like a flycatcher, with a long forked tail, a handsome black and white bird with purple wings, that looked like a shrike, and there was a great big tree-creeper, in figure, plumage and behaviour exactly like our familiar British species, but it seemed as big as a missel-thrush, as it ran up a tree with an ant in its beak; then there was a medium-sized speckled woodpecker, while on a dead tree over the river there sat a big, ungainly and not very beautiful kingfisher. Besides these, which all seemed busy with the ants, there was a small, pale hawk, flying like a merlin, and on another dead tree there sat in dignity a large grey hawk that I feel sure was the goshawk; then by the river there were chattering, noisy brown birds, perhaps an African dipper, a more elegant fellow with bright yellow shoulders, and some pipits.

This was a very different picture from that presented by the Luena and I hoped it presaged a greater variety in insect life.

In this I was correct, for during the short time by the banks of the Lumeje I took a unfamiliar grasshopper, a small, grey Pamphagid, with crested and incised pronotum and yellow wings. This is a typically African family, and some of its members attain a big size, one of the biggest being the monster, *Pamphagus elephas*, which survives in Sardinia as a memento of its former connection with the African mainland. This is the second Pamphagid that I have come across, the other being a grey, fat female, with rudimentary elytra.

We followed a small feeder of the Lumeje upstream; this is marked on some maps under the name of Camasamba, but my porters told me that it is called the Lusangaza; probably, as in Macedonia, rivers have different names in the different local languages; here we saw a couple of reed buck, and Pavel Stepanovich shot one, to the great edification of our mess, for it is about the best venison in the country.

At our next camp, I took two extremely interesting Mantid nymphs, both, I think, of that remarkable and well-known creature *Pseudocreobotra*, sp., with strange structure and unusual type of colouring. One of them was mauve, and as it sat on a leaf with its broad flat little lobed belly turned upwards over its back like a devil's coach horse, and swayed gently on its spidery legs, it looked for all the world like the flower of a violet pea which occurs sparingly in these woodlands. The other was, perhaps, even more remarkable; this was mottled pale grey above and black beneath and when sitting on a piece of lichen-covered wood, it completely disappeared; the coloration was absolutely identical with that of the lichen, down to the plain black underside of the curling edges; this specimen, imitating the lichen and not a flower, did not sway, but sat motionless and, moreover, did not tuck up its abdomen over its back; the illusion was complete. These immature Mantids are very versatile, for the few specimens I have found all seem to mimic different objects; I mistook one small one for a pale spider, and another, white with a black spot on its abdomen, looked like a bird's dropping. Yet I am not aware that the adult insect varies much; those that I have seen, including the single one I have taken, are all of the same pale buff, varied with deep green,

and a mark like a note of interrogation on the elytra. The lobes and excrescences on its abdomen and all its members help to break the outline and complete the illusion and assimilation to its surroundings.

One of the commonest grasshoppers in the scrub country here is a small Acridian (*Catantops*), brown in colour, with white markings on its flanks, and a broad, flattened head and pronotum; I found it abundant wherever I have collected so far; here, when looking through a dozen or so of them, I noticed that one seemed to be slightly different. A close examination revealed that it is not a member of the *Acridiidae* at all, but a Truxalid (*Prorisa*, sp.); the resemblance is so close that I should certainly have overlooked it had I not been accustomed to examining grasshoppers in detail, but the lens revealed a number of small but highly significant structural characters; otherwise, in size, appearance and coloration, it is almost identical. The grasshopper which it resembles so closely does not appear to enjoy any special advantage or protection; it is a fairly obvious creature, and hops and flies about boldly enough, yet is not brilliantly coloured as so many of its relatives are. It is certainly a successful species, for it is the commonest and most wide-spread that I have found here. It is difficult to see in what its advantage lies; perhaps in a special vigour of constitution, that seems to me to be the secret of the success of our abundant Palearctic *Stauroderus bicolor*, which seems to differ in no essential from several related but scarce and localised forms.

Now is the resemblance of this Truxalid to this successful species only accidental? or is it a case of mimicry? If the only advantage of the successful species is a vigour of constitution, it is hard to see the benefit to the mimicker, which certainly seems to be rare, for I can only find this one among my material so far to hand.

Butterflies do not seem to be more in evidence here than on the Luena, and probably it is the season which is to blame. There are only about a dozen species that strike the eye. One of the commonest is a dusty-looking Satyrid, with small ring-spots, and another which I feel sure I have taken in England; then there is a small yellow Pierid, a black and white butterfly that looks like an inferior sort of white admiral, and an anaemic-looking fritillary that has no silver on its underwings and cannot compare with our beautiful British *Argynnis*. There is one striking species which reminds me of specimens of *Kallima inachis*,* so frequently exhibited in museums to illustrate the striking upper-side and remarkable assimilation of the under surface to a dead leaf, midrib and stem included. This Angolan species has the same general coloration, but is smaller, about the size of a "red admiral," and not unlike it in type of pattern; it is fond of settling on the ground in glades in the woodlands, when the underside looks like a dead leaf on the ground; I have not noticed it settle on a plant. It is a striking fellow, and yet our own British *Vanessids* are just as striking, only they are more familiar. The only butterfly, that is at all common here and does not recall some European species, is a gentle little species that flutters about in the glades, of a very beautiful tint of rich red that I have not before noticed in the insect world; I caught a few, and find that they have rather long, narrow wings, broadly rounded at the ends, and as it is convenient to have a label

* Probably *Kallima rumia*.

for them, and so I must call them something, in spite of my ignorance of the Lepidoptera, I refer to them as the "red Heliconiid." I am sending some of the various butterflies to Mr. Bethune-Baker, with the request that he will be kind enough to name them for me, so that we shall know what we are talking about. Beyond these, I have seen a few obscure-looking Lycaenids, and the other day two fine dark Papilios that had an exotic look about them, yet were decidedly of the *P. machaon* type of pattern.

The little stream with the two names rises out of the main watershed itself, and it was a very short walk across the top to the other side, flushing a bustard out of a manioc field as we went. And now we were in the Congo basin and I ventured to hope for further additions to our list. We had come into the shallow, broad boggy valley of a small river called the Langiliko, which eventually runs into the Kasai, one of the important tributaries of the Congo, frequently referred to by Livingstone. We pitched our camp in some scrub on the dry ground and within a few hours I added nearly a dozen species of Orthoptera to the list.

What struck me most was that the season seemed to be more advanced on this side, although the watershed is neither lofty nor broad enough to make any obvious difference. On the south side Mantids were far from numerous and most were immature; yet here, the boys kept bringing me fully grown specimens of various species. Most numerous was a good stout fellow that recalls *Sphodromantis*, whose acquaintance I made in the Trans-Caucasus; about half the specimens were green and half brown; I am kept too busy to be able to watch living individuals to see if, as I suspect, they turn brown in the dry season soon after attaining maturity. Then there were several of a big, untidy Mantid with a very long pronotum, and several smaller species, some of a delicate mauve, others recalling our European genera *Iris*, *Ameles* and *Bolivaria*. They brought me also a single adult Stenopelmatid. This is a strange family, intermediate between the long-borned grasshoppers and the crickets; it is the only group of Orthoptera in which the tarsi are laterally compressed instead of being flattened, and the female has no long ovipositor; they are lovers of the dark, and lurk like crickets, whom they seem to resemble in their habits; this specimen was of a shiny rich brown colour and totally apterous; he had a bulky belly, and when I opened him to stuff him, he was full of a thick white fluid like milk; I did not observe whether he squirts this out in self-defence, as the *Bradyporidae* and *Hetrodididae* do with their yellow juice.

Other interesting creatures were a Stenobothrid grasshopper with a pepper and salt colouring, exactly matching the grey sand on which it lives, with bright red underside to its legs, and an Oedipodid of the same pepper and salt colouring, with yellow wings. Then there was *Acrida*, that strange genus of elongate grasshoppers, with long narrow and pyramidal head and ensiform antennae which is so common in late summer and autumn in southern Europe. Our species, *A. turrita*, has yellow wings, but here on the Langiliko I took two, with the same noisy clattering flight, one with yellow wings crossed by a strongly-marked black band, the other with red wings.

This elongate type of body is very prevalent among the Orthoptera in Africa, which is essentially a country of grass, and nearly every family

provides forms which can pass themselves off with ease for a blade of grass. The genus *Acrida* is a case in point, until it moves, and there are other Truxalids of the same form, some quite small, some with clear wings, some with red. Then there is what seems to me to be an Opomalid, with almost cylindrical body and pointed head; the general longitudinal pattern of coloration is very well marked in this species; the general colour is buff or yellowish, like the dry grass among which it lives, but there is a defined band of colour down the flanks, sometimes pink, sometimes brilliant silver, which enables it to mingle with the light and shade of grass like a tiger; as is frequently the case in such adaptive form, there is at least one patch of brilliant coloration by way of contrast, which is normally hidden; here, as is the general rule, the colour is in the inner face of the posterior femora, which in this species are purple. Possibly the use of this bit of colour, and the same may apply to the brilliant wings of the *Oedipodidae*, is for signalling to its kin. There is one genus that is even more striking in its elongation; I believe it is *Mesops*; it is of the same buff colour, but is even more slender and acute; the head is sharply pointed and the antennae are ensiform and legs short; when it wishes to hide, it "freezes" on a stem of grass, remaining motionless, extending its antennae packed together so as not to break the outline; as in the Opomalid, the bright colour is provided by the rich red of the thigh linings.

We see the same thing in some Mantids; one of the commonest is *Pyrgomantis*, a funny little cylindrical, elongate fellow, of the same dull buff, assimilating perfectly with the grass, its figure completed by a long pyramidal head; when caught in the sweep-net, it scuttles rapidly up the sides, but I have not noticed it hop like many young Mantids do; its legs are too short. Suddenly it will stop and stand motionless, and then it tucks its fore legs away very neatly in such a manner that they fit perfectly into the concave edge of the side flaps of the pronotum, and there you see nothing but a little stem of dried grass. Most of them, when startled, "freeze" in this way and then are very difficult to see, but the *Mesops*, when it thinks it is not observed, will fly clumsily, showing smoky or pinkish wings, and sit in the sun and stridulate with a feeble buzz, like that of our common *Chorthippus parallelus*.

Another rather surprising case is that of a diminutive Sagid. This is smaller and feebler than the *Pyrgomantis*, like it, it lives in long grass, and is slender, elongate and yellowish in colour. I feel sure that it is a Sagid from its figure, from the expression of his head and antennae and general body, but it is hard to imagine it a fierce carnivore related to our Balkan monsters.

We took a single Hetrodid on the Langiliko, the same species that I had found round the Luena Falls and in the rather richer country in that neighbourhood; he is but half the size of the big fellow which I found in swarms at Benguela Velha on the coast, and unlike him, is a diurnal beast; he starts cheerfully chirruping as soon as the sun has warmed the air, and stops towards the later part of the afternoon, when the irrepressible *Conocephalus* begins. The latter keeps up its ventriloquial chorus with its secondary drone for a couple of hours after dark. But I have not heard it now for the past week or two, perhaps because the nights are colder, for now we find ice on our water-buckets in the mornings.

There seems to be a turn in the season now; spring and autumn are still blended, but it is the African winter; we hear no insect chorus at night, for it is too cold, and yet the Locustids and crickets are reaching maturity, together with the Mantids and many grasshoppers. Until this week, the little violet-winged *Pyrgomorpha* has been common enough, but nymphs have been abundant; on June 15th I found the adults in clouds, and no more nymphs; they were so numerous that as I disturbed them from the sandy path as I walked they flew off into the dried bracken and herbage at the side, making a pattering noise like rain.

One of the beautiful grasshoppers of Africa is a *Pyrgomorphid*, a family that rejoices in gorgeous colours. This is the well known *Phymateus morbillosus*, frequently illustrated in books, and exhibited in museums; there is a coloured picture of one in the admirable postcard series of the British Museum. It is a big fellow, as big as a locust, of a brilliant green colour with lumps and knobs that are often tipped with red; the wings are marbled blue and yellow. Oddly enough, I have not come across it yet personally, but my boys have brought me in several adults and many larvae, the latter odd-looking black fellows, with yellow and green and red markings; the museum picture shows it is of a general buff colour, which is perhaps the final stage, but the fresh specimens that I have so far seen have all been bright green and one at least was taken on bright green grass near a bog.

There is a smaller relative (*Taphrorota* sp.) which is very beautiful too, with knobby pronotum, smooth plain green elytra and golden wings, with some golden segments in the antennae just before the tips. One would think that this brilliant coloration would render it conspicuous, but the case is the reverse; I have seen only one so far, and that fly high and fast and settle on a mimosa at a considerable height from the ground; it was out of reach and active and I was unable to catch it, though I saw it distinctly. Yet when it was flying in the bright sunlight I had no idea what it was, for the colours blend and disappear, just as they do with gorgeous birds like the bee-eater; and when he sat on the stem of the mimosas, and the golden sunlight twinkled through the masses of small, dark green leaves, this green and yellow grasshopper almost disappeared from view, as does the golden oriole under similar conditions.

(To be continued.)

NOTES ON COLLECTING, etc.

THE PREY OF DRAGONFLIES.—On May 28th, Whit Monday, by the bank of the old canal at the foot of St. Catherine's Down, Winchester, I observed a dragonfly, *Pyrrhosoma nymphula*, Sulz., pounce suddenly upon a female *Cupido minimus*, Fuess., which was settled with wings half spread on a broad blade of grass. The butterfly immediately dived down among the tall grass and herbage, where I had some difficulty in boxing it. The dragonfly remained perched on the spot where the butterfly had been and was seen to be chewing something. A large semicircular piece had been bitten out of the butterfly's right forewing, but apparently no other damage had been done.—WM. FASSNIDGE (M.A., F.E.S.).

THE SEASON.—Correspondents report *Colias croceus* from several localities around the South Coast from Cornwall to E. Kent as common and many single examples have been seen all over the Southern Counties. *Pyraucis cardui*, generally in worn condition, comes next from many parts, and *P. atalanta* in more than a few instances. It is suggested that they have come over against the prevailing northerly winds.—HY.J.T.

CHRYSOPHANUS DISPAR SUBSP. BATAVUS AT WOOD WALTON FEN.—It is anticipated that given favourable weather conditions considerable numbers of this butterfly will be on the wing about the middle of July, and should provide a splendid sight. It is hoped that Entomologists interested will take the opportunity of visiting the Fen about this time to see what has been done in preparing the terrain, so as to make the establishment of this experimental colony a success. It will be necessary for intending visitors to obtain a permit from the Secretary of the Society for the Promotion of Nature Reserves, British Museum (Natural History), Cromwell Road, S.W.7. The best way of getting to Wood Walton Fen is by train to Huntingdon and thence by car through Ramsay Heights. Intending visitors are requested to communicate with the Hon. Sec. of the Committee for the Protection of British Lepidoptera.—H. M. EDELSTEN, Hillside, Lindfield, Sussex.

CURRENT NOTES AND SHORT NOTICES.

The Committee for the Protection of British Lepidoptera would welcome subscriptions towards meeting the expenses of the experimental Colony of *Chrysophanus dispar* subsp. *batacus* in Wood Walton Fen. Through the generosity of Lord Rothschild and Capt. E. B. Purefoy the expense of mowing the terrain, planting extra docks, and flowering plants for the butterflies, etc., has been met, but the summer cutting of the reeds has to be done and the Watchers' wages have to be paid. The success of the experiment seems assured, more and more larvae are beginning to appear in spite of the almost record winter floods, and the stock hibernated in confinement is in splendid condition. Subscriptions should be sent to the Hon. Secretary, H. M. Edelsten, F.E.S., "Hillside," Lindfield, Sussex.

We recently chronicled the 3rd of the *Supp. Ent.* dealing with the Sumatran Insect Fauna, issued with the *Ent. Mitt.* of the Deutsch Entomologische Institut. We have now received the 4th number of this Supplement consisting of 124 pages with numerous illustrations. There are 14 memoirs by thirteen authors, treating of various families of Diptera, Coleoptera and Hymenoptera.

We understand that Signor Querci stayed in Portugal for the early spring emergences and has gone on to Central Spain to continue his investigation of the fauna of that area, where lepidoptera are much more plentiful than in the exposed western slopes of the more or less lofty Iberian Peninsula.

A separate of the *Schmetterlinge von Zermatt* published in *Iris* recently and referred to by us can be obtained for a few shillings from the author C. Vorbrodt, Lyss, Bern, Switzerland.

Those responsible for the carrying on of a local society have always

felt that its position can only be stabilised by publishing something. Whether it be a report in a local paper or magazine, an annual report, a periodical journal, it matters not. Some advertisement must be adopted. The Cambridge Natural History Society is one of the few which aims higher. We have just received a small pamphlet (No. 1, precursor of a promised series), "A Faunal List of Dermaptera and Orthoptera" as a first instalment. The County is taken as the area and each species dealt with is commented on, some of the notes being of wider interest than as a county record. For instance, "Dr. P. B. Uvarov has examined critically all the British specimens named *Acridium bipunctatum*, L., in the British Museum and in the Cambridge University Museum, and has concluded that almost all are referable to *A. kiefferi*."—"Thus *A. bipunctatum*, L., is not represented in these collections and perhaps does not occur in Great Britain." Such local intensive work is not only commendable, but also of permanent value in the study of distribution. There are two misprints on p. 8; such will creep in, but in no way detract from the value, and we congratulate the author Mr. E. B. Worthington, B.A., F.E.S., on having induced his Society to aim at something more than a mere report of proceedings.

The "New Hagen" *Index Litteraturae Entomologicae*, Vol. I., is published and comes quite up to our expectation, not only is all the information found in the old Hagen included, but a considerable amount of additional detail is added wherever needed. The items are numbered consecutively and not only in each author. There are 6542 items in this volume which goes up to "Ferrière." Marks denote all additions both items and additions to items, and wherever possible references have been verified by seeing the originals. The frontispiece has three excellent portraits, Hagen, Agassiz and Scudder. After the conclusion of the four volumes dealing with the literature up to 1863, the work will be continued to include everything published subsequent to that date. An enormous task, but one that Dr. Horn and his talented collaborateur Herr Schenkling are quite capable of carrying through.

A meeting of the Entomological Club was held at "Hodeslea," Meads, Eastbourne, on June 2nd, 1928, Mr. Robert Adkin in the Chair. Members present in addition to the Chairman:—Prof. E. B. Poulton, Messrs. H. Donisthorpe, H. Willoughby-Ellis, J. E. Collin, W. J. Kaye and Dr. Eltringham. Visitors present:—Messrs. G. C. Leman, H. J. Turner, K. G. Blair, A. L. Rayward, W. G. Sheldon, N. D. Riley, R. A. Adkin, A. E. Tonge, W. H. Miles, Edward Step and Dr. K. Jordan. The members and guests arrived at "Hodeslea" about mid-day and were received by Mr. and Mrs. Robert Adkin. Luncheon was provided at one o'clock. After luncheon an entomological excursion was arranged and in fine but cold weather, a long and most interesting ramble over the Downs towards Beachy Head resulted in a few captures, insects generally being very scarce. On returning to "Hodeslea" the annual business meeting of the Club was held, during which the visitors had an opportunity of inspecting Mr. Adkin's comprehensive collections of lepidoptera and his library which contains most of the best known ancient and modern works on entomology. Supper was served at 6.30 and a very enjoyable evening was spent, many of the members and visitors returning to London by the last

train. To those who were able to remain Mr. and Mrs. Adkin had very kindly extended their invitation for the week-end. On Sunday morning in brilliant sunshine an entomological excursion to Whitefield Woods was arranged. A large number of insects were collected including diptera, coleoptera and several of the most interesting lepidopterous larvae, and it was very gratifying to find some of our rare butterflies in numbers in the larval and other stages. The afternoon was spent in the flower gardens and Mrs. Adkin provided tea in her bungalow on the seashore. During the evening the entomological captures were exhibited and discussed, some of which will be recorded in the Proceedings of the Entomological Society of London. The party dispersed on Monday morning after having spent a most enjoyable visit.—H.W.-E.

Before our next number (Sept.) is issued, the Fourth International Congress of Entomology will have taken place at Ithaca, New York, U.S.A. on Aug. 12th to 18th, in the buildings of Cornell University. Dr. L. O. Howard, late chief of the Bureau of Entomology, U.S. Department of Agriculture, is the President and Dr. Karl Jordan of Tring is the Secretary. The Executive Committee is composed of Dr. Walther Horn of Berlin, Dr. Jeannel of Paris, Dr. H. Eltringham of Oxford and Dr. Sjöstedt of Stockholm. Only the Preliminary Arrangements have been issued so far but the program will be a very full one apparently. The Congress will be followed by a long series of Excursions from Aug. 19th until the return sailing on Aug. 31st, and will include visits to Niagara Falls, Washington and its wonderful Museum, Philadelphia, Boston, New York, etc., at an estimated cost of about 100 dollars. So far a record meeting is expected, as already between thirty and forty countries have signified their intention of being represented. The Circular of Information issued with the Preliminary Program is an interesting document and shows how much we British have lapsed in the freedom of our world relationship since the great war, and also the troublesome, costly and intricate regulations which the U.S.A. has found it necessary to make incident even on visitors, to keep the scum of the world from being dumped on them. Passport visé 9 dollars, Head Tax 8 dollars, etc., etc. No "waiver of fee" is allowed to British travellers because none is given in return.

REVIEWS AND NOTICES OF BOOKS.

SARANCHA I KOBULKI. (Locusts and Grasshoppers, A Handbook for their study and control, by B. P. Uvarov. Published for the Chief Cotton Committee by the "Promizdat," Industrial Publication Co., Moscow, 1927.) in Russian.

Mr. Uvarov has already placed orthopterists under a heavy obligation and now has added very substantially to his previous services. This work, which runs to 305 pages and is illustrated with 105 figures, is the most important work of a non-systematic character which has yet appeared dealing with these insects. It is written from the point of view of the student of Applied Entomology, of whom there are many in Russia, where locusts play so important a part in the national economy. The author gives a very detailed account, from all sources, including his own observations, of the minute structure and general habits of the group, which will be a revelation to the ordinary reader.

He draws a different picture of the grasshopper from that generally accepted. He doubts utility as a factor in the production of the often astonishing resemblance of these Orthoptera to their environment; he sharply questions a number of accepted beliefs, for instance that stridulation has the object of calling the female and even questions the capacity of the female to hear the sound and the functions of the abdominal tympanum as an ear. To him, the insect is a will-less automaton, responding to a whole series of tropisms and moved solely by reflex action.

It is not everybody, who will agree with all his views, some of which may well form the subject of lively debate. For instance, while he appears to consider crawling the normal means of progression (p. 66), he considers jumping as a purely reflex action induced by some stimulus, either of contact or by air-pressure. I cannot see any real difference between the two and if he is right, then certainly the necessary stimulus is conveyed also by vision. Over and over again, when I have been trying to catch an active Acridian or Oedipodid, I have watched him eyeing me, so to speak, and he will leap into the air and fly away long before I approach within striking distance, when stalking so gently and at such a range that it is difficult to think he merely responds to air-pressure on his tympanum.

All who have collected Orthoptera know only too well how easily the hind legs drop off; the author explains this also by a reflex autotomy. This may be the case in some instances, but autotomy can hardly explain the dropping off of the legs long after death. The joint seems so weak the slightest strain will break it off. The other afternoon I caught several grasshoppers and held them by the hind tibiae; if I held both, the creature was helpless; it could not leap for it had no fulcrum; why then did it not respond to stimulus and drop both its hind legs? or can it drop only one at a time? If I held one leg only, then it pressed with the other upon my hand, found a fulcrum, and hopped; in every instance the leg which I was holding remained in my hand, clearly torn off by the force of the spring. This we can hardly call autotomy.

This important and very suggestive work is in Russian, but the author is, I understand, preparing an English translation. This will be a notable addition to our libraries and all entomologists, and not entomologists only, will read it with intense interest.

May we express the hope that Mr. Uvarov will add yet another laurel and produce a similar work on the Locustid (Phasgonurine) Orthoptera and then afterwards upon the crickets and the other groups. The Mantids in particular offer a most attractive field for study.—MALCOLM BURR.

HOW ANIMALS FIND THEIR WAY ABOUT. By Etienne Ribaud. Translated by I. H. Myers. Kegan Paul, etc., and Co. Ltd., 7s. 6d.—This is a summary of the Study of Orientation and Place-Recognition. The problem is stated and the method of attacking is discussed, especially is it emphasised that the language employed must be free from suggestion of mental consciousness such as would be used in the study of human behaviour. "Doing this *in order to arrive at that*" is language most inapplicable conveying as it does, certain notions impossible in an animal. Orientation among flying insects is first

dealt with, the "bee-line" problem, various families of the Hymenoptera and their nest finding, are considered, many observations, facts and experiments being summarised and discussed in detail. Orientation in walking insects in next taken, the ants being dealt with in a similar way at considerable length. The author states, "Without a doubt, in all cases, the ordinary sensory ones are the sole factors entering into account. The explanation or the return to the nest in no way leads us to assume the existence of any unknown sense, which would merit the name of sense of orientation." Orientation in Termites and Molluscs is dealt with next, the remarks on the latter being very interesting. Chapter V. deals with Orientation in Vertebrates, and treats mainly of the carrier pigeon. After careful consideration of the apparently extraordinary facts the author comes to exactly the same conclusion as with the invertebrates (insects). In the final chapter of summary and conclusions the author makes some very important and suggestive remarks. First, one is struck by an analogy which allies all animals, invertebrate and vertebrate. Secondly, facts based upon well-conducted experiments and observations reduce the phenomena to a matter of sensory memory, a process of registration and elaboration, in which all the senses intervene in various degrees. It is essential not to be led astray by apparently phenomenal occurrences. "The pigeon which crosses hundreds of kilometers of unknown country, and returns to the cote gives us lively surprise—in our astonishment we forget all the cases in which in analogous circumstances a pigeon has not reappeared." The book is one of a long series of works dealing with science and philosophy and is well printed and produced as it naturally would be by this well-known firm.—Hy.J.T.

MEYRICK'S REVISED HANDBOOK (*continued from p. 96*).—When the first edition was published each of our three magazines reviewed it. In the *Ent. Mo. Mag.* (1895, vol. xxxi., p. 282), Lord Walsingham criticised his personal friend's work very gently, but nevertheless trenchantly, mainly from the point of view of a micro-lepidopterist. In the *Entomologist* for the same year (1895, vol. xxviii., p. 318), Dr. Chapman shows that the classification is completely on a mechanical basis, exhibiting little if any influence of natural affinities, or of living characteristics. "We are not so sure about anything as our author appears to be about everything." "We say 'appears' because, no doubt, much of the dogmatic cocksureness, that ruffles one a little sometimes, is due to the definiteness and brevity that we have found so highly to be praised from several practical points of view." The third review was by the late J. W. Tutt in the *Ent. Record and Journ. of Variation* (1895, vol. vii., p. 211). It was brutal in its treatment of the palpable and numerous inconsistencies and errors of fact. "It is a one-eyed book, compiled from one narrow point of view, and one only."

Let us now see how the author has dealt, in this edition, with the points of the various reviewers. First we must remark that he makes not the slightest reference in the preface to having accepted or otherwise any suggestions, which must have reached him from many sources. Lord Walsingham's covert remark that the (to us anomalous) position of the Rhopalocera was anticipated by a Polish author of a Catalogue of Cracow Lepidoptera remains unheeded. But the terms

"tegulae," "radius," and "cubitus," have been adopted as recommended for "patagia," "upper median," and "lower median" respectively. The description of the larva, which was "less satisfactory than that of the imago, might have been more instructive if the head, prothorax, mesothorax and metathorax had been referred to as such," has not been modernised. No notice whatever has been taken of the very strong complaint of Lord Walsingham that students should be asked to swallow such drastic changes in nomenclature on the *ipse dixit* of the author without proof of finality, nor of the attention called to the ignoring of Hubner's *Tentamen*, which was published before the *Verzeichniss*, as well as of the *Illustrations* of Stephens and of the *Synopsis of the Genera* by Westwood. (Lord Walsingham, particularly careful over nomenclature, did not discard items in the literature, but accepted both the *Tentamen* and the *Zuträge*.) *Tortricodes* is accepted as the genus for *tortricella*. *Eucosma* is still used in place of *Olethreutes* (Tent.). Of the four examples of non-prior or wrong genera resulting from such ignorance only one has been accepted in this edition. *Nemophora* is still accredited to Hübner instead of to Hoffmannsegg (Illig. *Verz.* 1798). *Anacampsis* is accepted for *populella* instead of *Tachypetilia*. Lord Walsingham points out that when an author adopts a genus it is necessary always to mention the type of that genus, but there is still no mention of which species is the type of a genus, and "it is scarcely conceivable that anyone who has studied Hübner's work should have failed to recognise the importance of supplying the deficiency." The genus *Ischnosia* is still retained for the prior genus *Guenea*, Millière. Such omissions preclude the work from being considered in the first rank of scientific treatises. It still remains a class-book, "the best class-book that has yet appeared—although neuration has been more particularly relied on."

Chapman refers to the author's omission to take into consideration a very important feature in Lepidopterous neuration, *viz.*, the gradual formation of the cell, and points out that its evolutionary stages can be traced in the Tineid Stirps and also in the Tortrices. In the revised edition a new phylum has been created from the Tineina for the *Nepticula* and their allies, *Nepticulina*. "The singular and constant type of neuration exhibited in the forewings of this group, to which no sort of approximation is found in any other Lepidoptera combined with its other primitive characters, mark it out as peculiarly distinct." The remainder of the Tineina which is stated to "probably comprise a third part or more of the entire order Lepidoptera" has been subdivided into six tribes although the author's own method fails him, for he admits that "an accurate tabulation of the 21 families is impracticable, owing to the confusing effects of failure of particular characters in exceptional genera." This is all done without any reference to the "very important feature" of Chapman.

Chapman also points out the wide gap, which exists between *Hepialus* and *Micropteryx*, both vertically, as well as laterally, and that the former does not and cannot belong to the Palaeo-lepidoptera; "a larva with well-developed prolegs and a pupa with so many parts well fixed cannot belong to the Palaeo-lepidoptera like *Micropteryx*." Yet the young student is still misled by rigid adherence to the one-character classification in this "revised" book.

The *Psychidae* is a group extraordinarily difficult to deal with, as is acknowledged by all, but as Chapman says, "No one who has examined the larvae and pupae, and the various stages of degradation of the female to complete limblessness can doubt to be a thoroughly natural one, possibly divisible into subfamilies, but still fairly homogeneous." In the former edition the *Psychidae* was reduced to three species, the remainder being placed in the *Tinidae*. In the present work six species have been transferred to the *Psychidae* of our author, which now contains nine species. It is rather remarkable that in the family diagnosis of edition I. the forewings have "7 absent," in edition II. the forewings have "8 absent." One does not see how three large species like *villosella*, etc., could be found to have 8 absent in 1928, and present in 1896.

Our author has acted on the remark of Chapman re *Nola* and *Earias* "whose ova are sufficient to divide them abundantly from the *Arctiidae*, even if the larvae and pupae did not so strongly differentiate them," and has given them family rank; *Nolidae* and *Hylophilidae*.

Polia still remains a mixture at which all who know the species in nature will cavil, *chi*, *exoleta*, *aprilina*, *viminalis*, *flammea*, *areola*, etc.

The misplacement of *Lampronia capitella* has now been rectified and it has been recognised "that there is no more natural generic group than the *Lampronias*" by placing the genera *Lampronia*, *Incurvaria* and *Phylloporia* (*bistrigella*) in a new family *Lamproniidae*.

Tutt incisively called attention to our author's amazing method of giving descriptions of larvae. In the present edition we read re the descriptions, "Those of the larvae (which need to be studied in life) are mostly compiled to the best of my judgment from a comparison of the most trustworthy results of other observers." Unfortunately "thirty-two years" has been too short a time for this revision although we are told in the preface, "The whole has been carefully revised."

The only difference between our author's genera *Chrysophanus* and *Lycaena* still remains, "Eyes glabrous" for *Chrysophanus* and "eyes hairy" for *Lycaena*.

Many, many other details might be referred to, but sufficient has been said to show that "Everything that has been done is ignored." The concluding words of Tutt, *Ent. Record*, VII. 216, unfortunately must still stand "The knowledge of the general lines on which classification must proceed is too firmly fixed for this, or any other book to do much harm." What a wonderful book might have been possible if . . . !

We cannot conclude without congratulating the publishers, Messrs. Watkins and Doncaster, the world famous naturalists, for the perfection of their work. The type and style is excellent, the paper good and the binding most adequate. The collector of British Lepidoptera must have a copy to identify his captures with any approach to certainty, although he will find the entomological world has gone far ahead of the antiquated and illogical classification with its reshuffling in nomenclature.—Hx.J.T.

ERRATA AND CORRIGENDA.—p. 81, l. 41, 'See my previous remarks' should follow '*E. decolorata*.'

p. 81, l. 49, for '♀' read '♂.'

p. 82, l. 11, for 'Skaler' read 'Skala.'

p. 82, l. 47, for 'Slivna' read 'Slivno.'—P. P. GRAVES.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. Hy. J. TURNER, "Latemar," West Drive, Cheam.

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Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytocecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong Collège, Newcastle-on-Tyne.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 3rd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. July 26th. Aug. 9th, 23rd. Sept. 13th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

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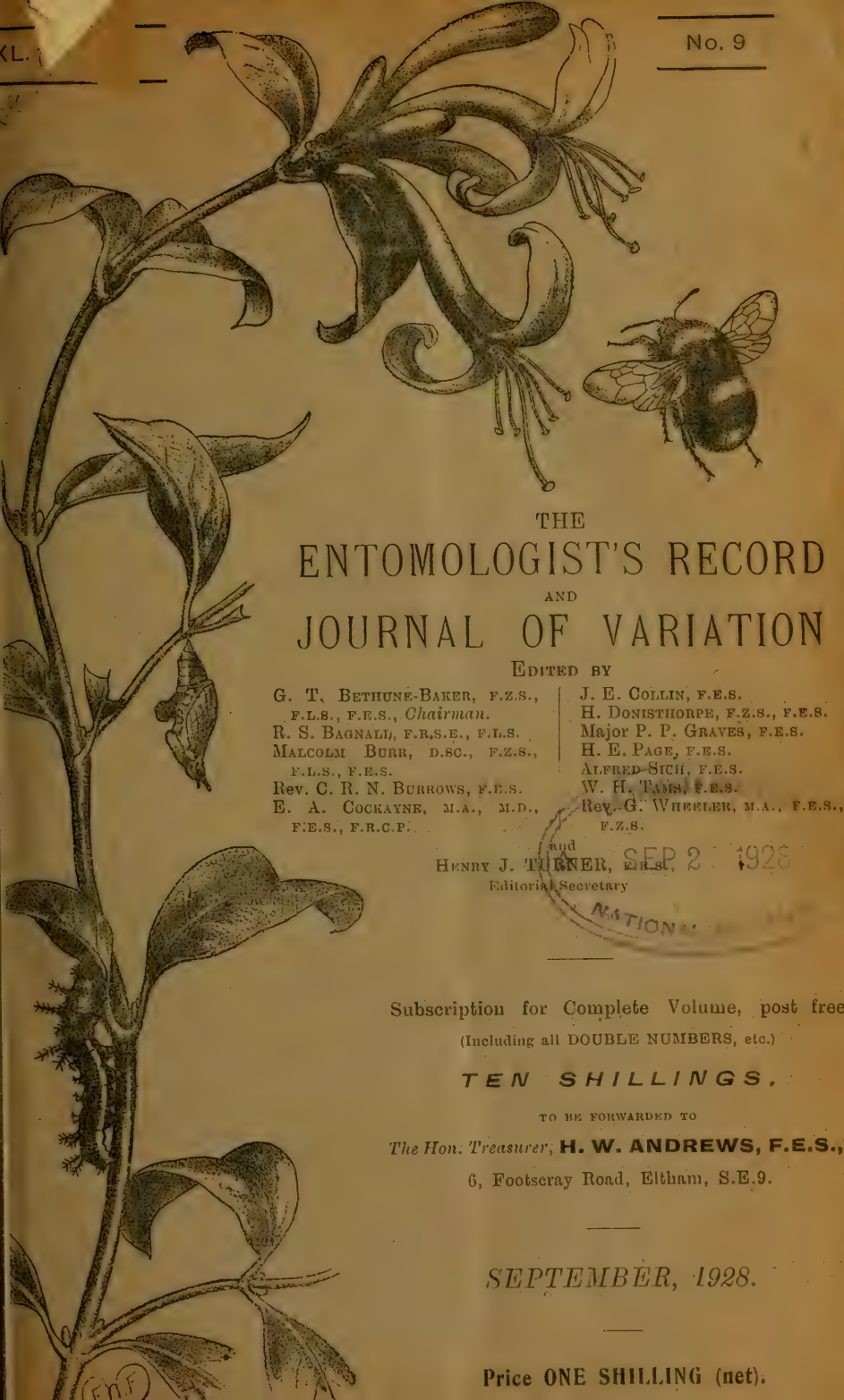
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Anaspis florenceae nov. sp.; a species of Coleoptera new to science; with a few notes on some other species of the Genus.

By HORACE DONISTHORPE, F.Z.S., F.E.S.

Upper and underside, antennae, palpi, and legs, entirely black. Upper surface finely transversely strigose, with very fine greyish-yellow pubescence. Long 3mm.

♂ Antennae long, narrow, slightly thickened towards apex, joints 1-6 elongate, 7-10 sharply defined, conical, gradually thickened, broadest at apex, last joint oblong; 3rd joint longer than 2nd; 4th joint longer than 3rd and 5th. Anterior and intermediate femora, and tibiae, a little thickened and sinuate. Anterior tarsi slightly dilated. Third ventral segment slightly produced and furnished in middle at apex with two slender laciniae, or appendages, which reach slightly beyond middle of fifth segment. Fifth segment slightly emarginate at the apex, and furnished with an elongate shallow cavity at the base which extends into the fourth segment. ♀ Antennae similar to ♂ but shorter, with all the joints shorter in proportion.

Described from two males and a female taken in Windsor Forest—1 ♂ by beating hawthorn blossoms, 8.V.28; 1 ♂ by beating rhododendrons, 5.VI.28; and 1 ♀ by beating elderberry blossoms, 28.VI.28.

I have named this species in honour of Miss Florence J. Kirk, who was with me when these insects were captured.

This year I endeavoured to capture males and females of as many species of *Anaspis* as I could, in Windsor Forest, for the Hope Department at Oxford. I first detected this species when mounting males, of all the species taken, on their backs. I had thought it was a specimen of *pulicaria*, but at once noticed that the antennae, and all the legs, were quite black, and the ♂ appendages very different. It belongs to the subgenus *Anaspis* s.str., and Reitter separates this from the subgenus *Nassipa* as follows:—

(a) 6th-10th joints of the antennae reversed, conical or cylindrical . . . *Anaspis* s.str.

(b) 6th-10th joints of the antennae roundish, or like a string of pearls . . . *Nassipa*.

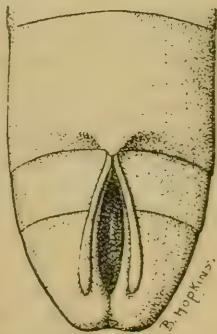
We now possess the following species:—

(a) *Anaspis* (*Anaspis*).

1. *A. pulicaria*, Costa (*forcipata*, Muls.).
2. *A. frontalis*, L.
3. *A. ruficollis*, F.
4. *A. geoffroyi*, Müll.
5. *A. subtestacea*, Steph.
6. *A. latipalpis*, Schil.
7. *A. maculata*, Geof.
8. *A. garneysi*, Fowler.
9. *A. septentrionalis*, Champ.
10. ***A. florenceae***, Donis.

(b) *Anaspis* (*Nassipa*).

11. *A. costae*, Emery.
12. *A. melanostoma*, Costa.
13. *A. rufilabris*, Gyll.
14. *A. hudsoni*, Donis.



It cannot be a melanic form of any of the other species of *Anaspis* (*Anaspis*), as the ♂ appendages do not agree with any of them. I sent one of my ♂♂ to Colonel Sainte Claire Deville and he replied—"I have nothing like it. None of Schilsky's descriptions agree with your

specimen. I think you can safely describe it. It is a very unexpected discovery."

It is perhaps as well to point out that the species of *Anaspis* can only be named with certainty by the help of the male characters; tables founded on colour alone are of little use. Both dark forms occur in the light coloured species and in the black species, such as *frontalis*, a number of colour vars., have been described by Schilsky, in which the elytra, thorax, and legs are yellow, wholly or in part. On May 19th, 1927, I took a ♂ of *A. frontalis* in Windsor Forest, by beating Mountain Ash, in which the four anterior legs are entirely yellow, and the posterior pair partly so. This appears to be the var. h. of Schilsky, and may be called **flavipes**, new ab.

I captured a number of yellow specimens of *Anaspis*, evidently two species, in Windsor Forest, on rhododendrons and elderberry blossoms, on June 20th and 28th. The one species was *A. subtestacea*, Steph., the male appendages of which are quite unique, and the abdomen is black in both ♂ and ♀. The last six joints of the antennae also are black. The other species proved to be *A. maculata* ab. *pallida*, Marsh, in which the elytra are entirely yellow, the underside is black (as in the typical form) and the last four joints of the antennae are black.

I was hoping to take *A. latipalpis*—of which I possess specimens from Chale, Isle of Wight; Barrons Wood, Cumberland; Cheshunt, etc. This species is entirely testaceous beneath, and the antennae have the last five joints black. The anterior tarsi are much less dilated than in *maculata* and the palpi are considerably broader. The ♂ appendages are quite distinct.

We really require a new set of figures of the male appendages of all our species. The plate by the late Hereward Dollman [*Ent. Rev.* 21, plt. III. 60 (1909); Fowler and Donisthorpe, plt. A 200 (1913)] is quite good in that it shows the differences between the species, but it is not complete as regards details. In *frontalis*, in my specimens, the appendages are less parallel (it must be remembered, however, that the appendages are movable, and can be raised, or set apart, with a setting needle or a fine paint brush) than in his drawing fig. 2, and are hooked at the end and not before it; also there is a cavity with raised sides towards the apex of the 5th segment. In *subtestacea* there is a central lacinia to the appendages on the 2nd segment like a fork with three prongs, the central prong being shorter than the two outside ones, and the 5th segment is deeply cleft at the apex.

Dollman's fig. 12, should stand for *latipalpis* and not for *maculata*; and fig. 13, will not do for either, as the appendages in both are from the apex of the 3rd segment, not from the 4th!

In *A. maculata* there is a long narrow cavity, below and between the appendages, at the base of the 5th segment, and there is another, smaller rounder, cavity with raised lips at the apex.

Dr. Verity's Nomenclature (a rejoinder).

By A. J. WIGHTMAN, F.E.S.

On pages 56 and 57 of the present volume, Mr. P. P. Graves replies to my criticism of his article. It seems to me, from his remarks that he and I think the same on the main points of the argument; he accepts

my definition of what a subspecies should be, as an "ideal" and proceeds to show that it cannot be applied as a cast-iron rule, this I fully concede and have never claimed otherwise.

I should answer his questions as follows :—Not for a moment would I suggest that *dispar* should be reduced from a subspecies to a mere form, because there MAY be some evidence that *rutilus* has in the past occurred in England with *dispar*. Nothing less than *proof* that both had been bred from a batch of ova laid by a single ♀ would cause me to do this. I can visualise a dozen ways in which *rutilus* may have found its way into British collections and the name into British records, more probable than that our *dispar* stock occasionally produced *rutilus* forms. Nor do I consider that ONE *Melitaea didyma* with a central European facies taken among hundreds of ssp. *deserticola* would in any way weaken the claim of that form to subspecific rank, especially as its origin is unknown beyond the locality in which it was taken. As to the *sertorius* (*sao*) taken by Turati in Sardinia among *therapne*, if these are true *sertorius* and in no way distinguishable from *sertorius* taken elsewhere, and can be proved to have had the same parentage as the *therapne* among which they occurred, then I think *therapne* is something less than 100% subspecies, although it would still remain a very well characterised local form, rightly and usefully named.

Mr. Graves will, I am sure, admit that there is an immense difference between the standing of the above subspecies and the sort of race (local form called subspecies) with which I found fault in my article.

I still dislike that word Onomatophobia even more since hearing the plain English translation. No serious student of variation suffers from "an excessive dislike of giving names to variations," but a great many do dislike the giving of subspecific names to local forms on trivial and unfixed characters found only in a percentage of the colony in the particular season when the series was taken.

I am a disciple of Tutt and agree that all distinct forms need a name, but although names are essential, they need to have descriptions attached from which the form to which the name applies can be recognised. Names are useless when the description in connection with them is so wide in scope or general in terms, as to apply equally well to quite a number of distinct looking individuals. Names are equally useless when they purport to describe a local race (subspecies), but in fact only describe a hypothetical individual, the special peculiarities of a number of individuals being drawn on for the purpose.

Mr. Graves allows that some of Dr. Verity's race names have been unwarranted and others are less than subspecies. I said no more.

As to the statement that "workers of standing" are inclined to disregard all names other than specific and subspecific, is it not obvious from the rules proposed by British Nat. Committee on Entomological Nomenclature that this is so?

Lastly in the matter of the *vulgaris* of *Pararge aegeria*, I must agree to differ from Mr. Graves. The whole matter hinges on the standing of one of Verity's races, and Mr. Graves and I rate it differently.

With the remarks of Mr. Parkinson Curtis in pages 59 and 60 of the present vol., I largely agree.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

IX.

In my last letter I referred to the River Langiliko, where I found several species of Orthoptera fresh to me. Since then, I have spent another couple of days on its banks, and have come across some very curious things.

The stream is straight and the valley is very shallow, only some ten or fifteen feet below the level of the top of the main watershed at this point and the Langiliko is the most southerly of the tributaries of the Kasai, which eventually runs into the Congo. All the streams to the south of this watershed run into the Zambesi. Like all the river valleys in this region, it is an expanse of bog, through which the river itself winds its course. But the sides of the bog of this part of the Langiliko are straight for a good many miles, perhaps twenty or more.

There is not much life in the long grass that skirts the actual bog, nor in the boggy ground itself: there is a small dark cricket with a loud clear note that sometimes strikes up in the afternoon and takes a great deal of catching, and a few grasshoppers resembling the common European *Chorthippus pulvinatus*. Bird life is not abundant; swallows, both white and red bellied, skim over, and sometimes a pair of huge white storks stride by, or some bustard fly over, with necks outstretched, for they fly like geese, also a pair of small bee-eaters, perfect little gems of emerald, about half the size of our familiar European *Merops apiaster*. There are some buck about, for we see the spoor and droppings, probably roan, oribi, water buck and duiker; we know there is reed buck, but we seldom see them and still more seldom get a shot.

Between the grassy bog and the adjoining forest there is a strip of desert which extends the greater part of the length of the river but very narrow, generally a foot or two wide but in places by the Langiliko it attains a width of 1-200 yds. It was here I found interesting things. This is real desert, for where it is invaded by trees they are stumpy and stunted and sparse; except for bogs, all the soil is a loose dry sand, but along this strip there is little vegetation: what there is consists of some patches of tough lank grass that grows in tufts and not in masses, and some low, fleshy leaves are shooting out of the ground; it gives the impression of a patch of real xerophytic flora. The sand here is quite white, bleached by the sun, but grey where recently disturbed, and speckled with black specks blown on from the numerous burnt patches around. So the prevailing colour is greyish white speckled with black, and dotted with thin tufts of lank grass. On this, the grasshoppers tend to assume a pepper-and-salt pattern which matches their background exactly; I found several specimens of an Oedipodid and also of a Stenobothrid of exactly this pattern.

Grey and lanky Mantids, recalling *Bolivaria* of the deserts of the Levant, are sometimes seen running on the ground, and here and there one picks up a Pamphagid. Now this is a very interesting family of Orthoptera. There are several genera, some of which contain numerous species; it is specially characteristic of the Ethiopian fauna, but a good number of species were left behind in the south of Europe when the African continent was cut off from it, and may be found in

suitable localities, in the right season. They frequent dry, hot spots, and are associated with the desert fauna. In this part of Angola, where the desert survives only in little patches, they are neither numerous nor prominent. I have come across about half a dozen species, but of only one have I two specimens. The body is compressed, with an arched and acute pronotum; the hind legs are feeble and it is a poor jumper; the males are generally winged and the females usually apterous. I saw one big male, but he was too nimble for me. He sat, mingling with the grey sand, watching me, and his characteristic figure could be plainly distinguished when once recognised; but directly I approached within striking distance, he flew off with a dashing flight like a locust and settled some fifty yards off. I saw quite distinctly his smoky wings with black fascia; he was a big fellow, like a grey locust, and I hope to bottle one before long. The females are easy; one has only to pick them up with the fingers; they are big and clumsy, flightless, and walk rather than run, occasionally giving a short and clumsy leap. The prevailing colour in the family is a dull grey, to match their background, but as is frequently the case, they seem to like a bit of colour and to carry it hidden; as a rule the inner face of the posterior femora is brightly coloured, red or orange. Strangest of all is the colouring of the neck membrane. About twenty years ago Professor Poulton contributed a paper to the *Entomologist's Record*, if my memory serves me rightly, on this very point, based on some very interesting observations by a Russian entomologist named Portchinsky, who showed that in the Caucasian genus *Nocarodes*, this neck membrane is of a bright indigo. As the normal position of the head is retracted into the pronotum, it is not visible, and is not seen in dry specimens, so that its existence was not suspected until the living creature was observed. When the head is stretched forward, as when the insect is feeding, this soft membrane between the head and the pronotum is visible, and in the genus referred to is of a bright indigo. Now it is a remarkable fact that I noticed the same thing in *Tmethis heldreichi* in Macedonia, a member of a group that is not related at all closely to the *Pamphagidae*, only as it lives under the same conditions it has followed a parallel line of evolution, and superficially the two families are very much alike and show the same phenomenon.

It was therefore with considerable curiosity that I looked at the neck membrane of these African *Pamphagidae*, and was delighted to find them either of the same deep indigo, or else, in one case, pale grey with a black patch on each side, which shaded to indigo blue in the centre. In ordinary Orthoptera this membrane is of a white or greyish colour. It is hard to imagine what use this indigo membrane is to the insect: it has been suggested that it can be used as a kind of signal, to sign to its fellows. In Macedonia Captain Campbell, a good observer, watched *Tmethis* carefully, but obtained no clue. Probably the brilliant lining of the posterior femora, which is normally hidden, serves the same purpose. I hope I may have the luck to see it in action while here in Africa, but specimens are few and far between, and it requires much patience and still more time to watch them long enough; and it is the time which is the difficulty.

I am inclined to think that these Pamphagids occurring on these open patches of sand are a relic and that the country has only com-

paratively recently been covered by forest. This idea was confirmed by finding other representatives of the desert fauna here, such as an Orthoderid Mantid and above all, some flat, broad little grasshoppers, widely dilated at the shoulders, apterous, and very feeble jumpers, mostly as white as the sand on which they squatted. I believe they belong to a new genus near *Chrotogonus*, a relative of *Pyrgomorpha*, which is represented in the sandy parts of eastern Africa and western Asia. It requires very close attention to find them, so well are they protected by their adaptation to their environment, but in no other way, for they are slow and immobile. Such a species as this cannot carry out a forward policy. It has over specialised, and can hardly live outside its own particular environment. Alter its conditions, and it cannot adapt itself, and is doomed. If, as I believe, the forest is a newcomer in this district and is steadily encroaching, then this species is doomed, at least in this region; it is already scarce, and in spite of careful search, I have found only a few specimens, and those in one spot. Their fate is like that of the flint knappers of Brandon; once flourishing specialists, they are now doomed before the relentless advance of modern conditions.

Another curious observation gives rise to thought. The natives are in the habit of firing the grass in the beginning of the dry season; perhaps accident and nature helps; consequently, burnt, blackened patches are numerous. As the grass grows in tufts, we find a mass of blackened tufts dotted thickly about a background of grey or white sand, which is speckled with the black dust of the charred fragments. While larger creatures flee before the fire, small things, as obscure insects, can doubtless survive by "lying doggo" in these bare interstices. At any rate, I find some small Acridians and Stenobothrid grasshoppers numerous enough even on fairly extensive burnt patches covering several acres, and these all tend to have a blackish coloration. One rather larger kind, a heavy Acridian, which I have found only on such a spot, is nearly black, with a bluish tinge, and he mingles well with his background. But he is an active fellow, and can escape from ordinary enemies by powerful bounds and short but vigorous flights; his wings are tinged with blue, and his posterior tibiae are deep indigo blue. I believe he is but a colour-variety of a species that seems identical in structure and is common in grass and scrub, whose normal colour is dark brown, with purple tibiae.

But more striking than this, more striking than the pepper-and-salt *Oedipoda* and dingy black and greyish grasshoppers, are some small Truxalids which I found frequenting the burnt patches of grass at one spot on the banks of this interesting river. I do not know yet what the species is; it is a small Truxalid, of elongate form, with sharply pointed head and ensiform antennae, like a diminutive *Acrida*. It is clearly related to a small pale, buff species which occurs in the sun-dried grass around. But those which I took on this burnt spot were the closest possible imitation of a piece of charred grass that could be imagined. Several of them were of a dull, sooty black, darker at the head and fading somewhat towards the tail; as the body is slim and straight, such a black streak is almost indistinguishable from a piece of burnt grass; and, like all grass-haunting Orthoptera, it always adopts a vertical position, parallel with the standing grass, and blends perfectly with its surroundings.

But this is not all. Jutting up from the burnt stumps of grass, there are always a few bits of buff that have escaped charring, and produce the effect of a few lines of yellowish brown or buff mingled with the black, and this is faithfully reproduced in one specimen which is all black but for a well-defined light brown dorsal stripe.

Yet one step more. Within a few weeks of the conflagration, there appears, even in the dry season, a few specks of green, where the tender young shoots of fresh blades are showing their tips, and so an occasional touch of light green is added to the picture. And the very pitch of perfection is reached in these grasshoppers by one specimen which is mainly black, has a brown stripe, and, to complete the picture, a little light green stripe on each side of the pronotum. When such an insect sits in a vertical position among these stumps it disappears completely.

Accustomed as I am to the adaptation of insects to their surroundings, which is constantly shewn by so very many species of Orthoptera, I have seldom seen a more striking instance than this. And it is the more surprising as it is a case of adaptation to what is a temporary, fleeting condition, for it is but a matter of weeks before the green predominates in these burnt patches; already around me I see the tender shoots jutting out on the sites of conflagrations that cannot be more than four or five weeks old at the maximum. I do not know what is the expectation of life in a grasshopper when it has reached the adult stage, but probably several months; I cannot see any logical reason why they should not survive till the end of the season, that is, until the first rains, or even longer; that means a life of about four months for them, of which the greater part will be under green, followed by yellowish, and then again by green, conditions. Then it will be useless for them to resemble a bit of burnt grass.

It would seem as though they respond automatically to their environment when caught at the critical moment. In this case, the very perfection of their disguise may well be a source of advertisement and danger to them later on, like Siberian hares and ptarmigan, which turn white before the snow falls and so become for a time dangerously prominent to their enemies.

Of the four types of Orthoptera fauna in Africa, that is, the desert, bog, savannah and forest types, I always think the first is the most interesting. And I am convinced that Africa is its original home, for nowhere else has there been a continuity of arid desert conditions at least from Permian times, and probably earlier, down to the present day. Evolution works extremely slowly with the Orthoptera and there is evidence that species living to-day were in existence as far back as the Oligocene, so that for development of genera we must go farther back indeed, and for the separation off of subfamilies and families to an immensely remote age. The deserts of Asia are mostly of far younger age, and so I am persuaded that it was here in Africa that the *Pamphagidae* branched off from the *Aceridiidae*, perhaps somewhere about Permian times or possibly as late as the Trias, that it was here that they developed the various genera and numerous species, and that it was Africa that supplied both Europe and Asia with its desert life, or much of it, to be subject to further evolutionary development as they proceeded.

It has always puzzled me how the bog fauna arose, or rather spread.

How is it, for instance, that in England certain very well-defined species, as *Mecostethus grossus* and *Niphidium dorsale* are found only in bogs and reedy places, thus often confined to very localised spots, yet occurring in widely separated localities? It seems necessary to imagine that at some time or other all these marshes have been in connection with each other to permit the transference of their fauna. Similarly here in these African bogs I find two very curious, highly specialised crickets, *Trigonidium cicindeloides* and *Tridactylus* sp., the latter so distinct that it may require a family all to itself. Both these occur in suitable spots practically throughout southern Europe and through Asia at least as far as Burmah. How did they come to be so distributed?

Africa is essentially a country of savannahs, and so the grass-frequenting fauna has reached a high development here. I imagine that the savannah is the stage of landscape succeeding the desert. The Ethiopian fauna is especially rich in Orthoptera adapting themselves to life in long grass and offering most admirable examples of adaptation to environment; we find the same phenomenon in such diverse groups as the Mantids, and Truxalids, Acridians, the *Conocephalidae* and even the *Sagidae*. Some of these have lingered on in the south of Europe, but Africa is beyond doubt their original home. As I have mentioned in an earlier letter, the *Sagidae* here are very insignificant little creatures compared with their powerful and aggressive European relatives; no European *Saga*, with the possible exception of *Saga campbelli*, Uv., could be called a grass-haunting insect, for they are much too heavy for any European grass, and have adapted themselves to shrubs which can support their weight. I feel sure that the big winged *Sagidae* of the Transvaal have done the same, though there they may find grass strong enough to support them. They are lighter built than our biggest Levantine species, and grass in Africa grows to ten and fifteen feet in height.

Systematically, the European *Sagas* are in a state of chaos and it is risky using specific names; but all who are familiar with these monsters in the field know that a characteristic pattern is green with some short lateral stripes. I have never attached any importance to these stripes before, but now see a significance in them. These great insects, that sit perched on points of vantage on shrubs dominating the grass around, wear these white stripes as a remnant of that longitudinally striate pattern which was characteristic of their African grass-haunting ancestors, of the general uniform of the savannah Orthoptera; it remains as a token of the past, like the buttons at the back of a frock-coat.

The forest fauna in this part of the country is disappointing. I have found both species and individuals scarce. Among the arboreal *Phaneropteridae* I have found but two or three species and only taken a few specimens of each. Of the *Pseudophyllidae* I have not seen a sign, yet, unless my memory betrays me, there are plenty of species in the forests of equatorial Africa. Perhaps this scarcity is to be explained by my theory of the youth of these forests of the highlands of Angola; perhaps the climate is too cold for them, for here in the dry season it is very cold at night, and we sometimes have quite a thick coat of ice on our waterbuckets. The arboreal *Phaneropteridae* are active fliers and would easily accompany an advancing forest. It is, however,

different with the *Stenopelmaticidae*. Of these curious creatures I have found two very different species; one is a spidery creature, like our cave-haunting *Dolichopoda* of south Europe, but him I have taken only in houses. The other is of a very different type, a heavy, fat, shiny-brown, ugly creature; this, I believe, lives in burrows or in old timber on the ground; I have but three specimens, brought me by the men who found them when clearing the ground for camping. Both these creatures are totally apterous and specialised to a high degree.

(To be continued.)

Note on the proposed substitution of *Erebia alecto*, Hb., for *E. nerine*, Frr.

By B. C. S. WARREN, F.E.S.

In 1914, Turati pointed out (*Atti. Soc. It. Sc. Nat.* LIII.) in an interesting article, that Hübner's figures 515-516 represented ♂s of the species known as *nerine*, Frr., and not ♀s of *alecto*, Hb. He then, on the strength of the fact that pl. 101 has page priority over pl. 104 on which Hübner figured ♂ *alecto* (figs. 528-9), asserts that the name *alecto* must replace *nerine*, Frr. This view has been accepted by many entomologists on the Continent, and following it Schawerda has proposed the name *teriola*, pro *alecto*, Hb.

Now Turati was perfectly correct in stating that Hübner's figs. 515-6 represented *nerine* and not *alecto*, but he fortunately seems to be mistaken in asserting that we must in consequence of this error of Hübner's exchange the names of these two well-known insects.

The facts of the case are as follows:—

In 1804 Hübner described and figured two species under one name. His original description applies the name definitely to both sets of figures, and according to the text his "*alecto*" covered both the forms he illustrated. The first lines of his description read; "63, Düsterrauner Falter; *Papilio alecto*, Pap. 528, 529, Mas; 515, 516 Foem."

The position therefore was that two species being covered thus by one name, it was open to the first reviser to give another name to either species, whichever he chose. There seems no doubt, however, that all the contemporary writers accepted *alecto*, Hb., for that form of *E. glacialis*, Esp., which has borne the name *alecto* ever since, and that they did not recognise Hübner's error, although Ochsenheimer does question if ♀ *alecto* similar to Hübner's figs. do occur. This state of things continued until Freyer discovered *nerine*. He, almost certainly, did not recognise Hübner's figs. 515-516 as the species he was describing, but he accepted Hübner's *alecto* in the accustomed sense. He was perfectly at liberty to give a name to either *nerine* or *alecto* (had he known it), but his action in describing *nerine* definitely restricted Hübner's name *alecto* to the insect figured by Hübner on pl. 104, figs. 528-529.

Turati's discovery therefore, while of interest, does not justify him in substituting *alecto*, Hb., for the well-established *nerine* of Freyer.

Dr. K. Jordan, to whom I am much indebted for a critical examination of points of this case, considers that Freyer's action cannot be

interfered with unless some other writer has forestalled him, which so far as I can ascertain did not occur.

The names *nerine* and *alecto* will therefore stand for the insects at which they have always been applied, and *teriola*, Schaw., will fall as a synonym of *alecto*.

Turin, Arquata Scrivia and Oulx, in May-June, 1927.

By LIEUT. E. B. ASHBY, F.Z.S., F.E.S.

(Concluded from p. 94.)

CORRECTION.—*Ante* p. 92, line 15, for "trains" read "trams."
p. 93, line 9 from bottom, for "gave" read
"gavi."

May 31st.—During the last few days I have searched in vain to get some more *H. sidae*, which is evidently a June rather than a May insect here. The privet and honeysuckle are now fully out, but no hairstreaks are to be seen yet on the former, which however attracts the beautiful Burnet moth *Zygaena transalpina*, Esp., and also the large Hymenopteron *Triscolia flavifrons*, Fab., of which I took my first specimen, a fine female to-day settled on thyme, but I missed a fresh male on the privet blossom around which it was curled, somewhat resembling a yellow belted Burnet moth. This species is, I believe, rather a south central European than a west European insect. I shall be glad to know more of its distribution in western Europe. I never saw it at Arquata in June, 1918. On May 29th I saw a fresh specimen of *M. galathea* var. *procida*, the form of which here is the most beautiful I know. I have taken to-day females of *Polyommatus thetis* (*bellargus*) ab. *ceronus*, one of which is the most beautiful specimen of this var. I have ever taken, surpassing those from Digne in beauty. Several fresh specimens of *Nisoniades tages* were taken. The moth *Cymatophora ocellaris* came to my bedroom light the last night at Arquata. I left here for another two days collecting at Stupinigi Wood. The heat has been suffocating.

June 2nd.—I have spent most of to-day and yesterday afternoon in Stupinigi Wood. The picture was very different from that when I was last here on May 18th. To-day fine fresh specimens of *A. aglaia*, *A. cydippe* var. *cleodoxa*, *Limnitis sibilla*, *Strymon w-album*, and *S. ilicis*, were frequently to be found on the blossoms of the privet, whilst perfectly fresh *Melitaea pseudathalia*, females of *P. argus* var. *argyrognomon*, and of *P. thetis*, specimens of *Hesperia sertorius* (*sao*) and the beautiful Tineid moth *Nematois scabiosella* were taken. *Polygonia c-album* were in small number but also perfectly fresh and I took a specimen of the Dipteron *Ocyptera bicolor*, Oliv. Imagines of *M. galathea* var. *procida* were in small number just emerging, but they are not so dark as the Arquata race. I saw nothing of the spring brood of *Chrysophanus dispar* var. *rutilus*. I then left Turin for Oulx, formerly an old French town as the name indicates, in the Cottian Alps of Italy, where I took up my quarters at the Albergo del Commercio for a few days to try the possibilities of this locality about which Dr. Verity has written so interestingly in the pages of this magazine. Contrary to his experi-

ence I found the grounds around and westwards of the two small lakes much more productive at this period than the ground around the rifle range, which he found so productive in July and early August. The hotel was clean and the service as good as could be expected for a small country inn and on the whole I much enjoyed my stay and hope to return another year.

June 4th.—I collected yesterday morning at Oulx in the vicinity of the rifle range, but found very little except some interesting Coleoptera and Hymenoptera including a specimen of the ant *Camponotus ligniperdus*. I also found a considerable quantity of larvae feeding on the various bush plants, etc., of the hillside, which produced imagines in England in July and onwards, and I also took the fly *Empis tessellata*, Fab.; it rained afterwards from midday to midnight. The next morning I spent in the woods and meadows around the two small lakes, with much better success as I found quite fresh *Hesperia sertorius* (sao), Hb., and very fine *Hesperia carthami*. I also took one specimen of *Anthocharis ausonia*, a couple of *M. cinxia*, a single *Brenthis euphrosyne*, two not quite fresh of *M. aurinia* (almost the only ones seen at Oulx), several fresh *Polyommatus semiargus* (acis), and a couple of *B. amathusia* apparently just emerged, also of *Z. achilleae*, Esp. I was much struck by the quantity of dragonflies around the lakes; they are most numerous and more varied than I remember having seen anywhere else. A specimen of *Libellula quadrimaculata* that I took is certainly a variety from the ordinary English form. I was unable to give the time to the collecting of dragonflies that I should like to have done. A few quite fresh *Aporia crataegi* were flying about but the *Callophrys rubi*, which I saw, were quite over, even at this height. This afternoon I collected above Oulx in the direction of Saux d'Oulx, but beyond getting a number of Coleoptera and Hymenoptera and a single specimen of *Hesperia carthami*, with the Asilid flies *Pamponerus germanicus*, L., and *Dioctria atricapilla*, Mg., the afternoon was a blank owing to the presence of dark thunder clouds. At night a fine specimen of the moth *Notodonta tritophus*, S.-K., entered my bedroom and was secured. This was followed shortly afterwards by a fair specimen of the moth *Cerura furcula*, L.

June 5th.—The National Fête day in Italy. This morning I collected again around the two lakes and the weather onwards was radiantly fine. I kept on the sides of the lakes away from the railway under lee of the woods to gain shelter from the very strong wind which has been blowing all day to spoil a beautiful sunny day under a cloudless sky. I got single specimens of *B. euphrosyne*, *M. dictynna*, *M. cinxia*, *P. semiargus*, *M. aurinia* and several *Hamearis lucina*, also one of *Pararge hiera* and the beautiful Dipteron in cõp, *Stratiomys furcata*, F., which I have taken for the first time. I also took to-day the moths *Agrophila trabealis* and *Pyrallis farinalis*, L.

June 6th.—To Meana by morning train. From the station I walked up to the village of Madonna della Losa and back, 14 kilometers in all, but a very steep walk and when you reach the village, be it remembered that no food or drink of any kind can be obtained there. Water can be obtained at several points of the road, that is all. On the way up I took several species of beetles and one specimen of the moth *Setina aurita*, *A. niobe* var. *eris*, *A. aglaia*, fresh *P. cardamines* ♂ and ♀; several *H. lucina*, and odd specimens of *A. lathonia* and

P. semiargus. A few fields below the village and around the village itself produced a fine series of perfectly fresh *Erebia ceto*, whilst in one large field in which the globe flower was fully out in great abundance and immediately adjoining the village I got four fine fresh *Parnassius mnemosyne* and saw others. On the way back down to Meana I saw a specimen of *Libythea celtis* flying at the spot on the road mentioned in *Ent. Record*, Vol. XXXIV, page 159, but it did not come within reach of my net.

June 7th.—This morning I collected again around the rifle range but I again found it very unprofitable. Leaving this ground I mounted over the hill on the way to the two lakes and on the ascent I took *Papilio podalirius*, *P. machaon* and two fine fresh *P. apollo*. The ground around the two lakes yielded *M. dictynna*, *B. amathusia*, *P. semiargus*, one or two grey skippers, and a single fresh *Erebia exias*, some fresh *P. hylas*, males only, *M. aurelia* in some numbers and excellent condition, *B. euphrasyn*e of which I took one nice variety, *M. phoebe*, including the largest female of this species I have ever taken, also a specimen of the Dipteron *Hemipenthes morio*, L.

In the afternoon I collected again around the two lakes and took a single specimen of the Dragonfly *Orthetrum cancellatum*, McLach. There were many species of Dragonflies on the wing and I wished that I had had the time to sample them properly. Mounting the forest track to the left above the two lakes I worked up to Villaretto; on the way I noticed a *Thais* which I failed to secure, and higher up on more truly Alpine ground a fresh male of *Colias phicomene* which succeeded in eluding my net. I took a fresh female of *A. ausonia* and a specimen quite fresh of *Hemaris fuciformis*, L., also specimens of *H. serratalae* and very fresh *N. tages*, L.

June 8th.—Before leaving Oulx for home this afternoon, I collected again around the two lakes, the best ground at Oulx for this particular period of the year, and I netted more *M. dictynna*, *M. amathusia*, *M. aurelia*, *P. machaon*, a female of the large race *alpina*, Verity, of *Euchloe euphenoides*, and a single specimen of *M. aurinia* which is apparently quite over.

The beetle *Leptura melanura*, L., was very abundant to-day on its addicted plants, and the hymenopteron *Allantus arcuatus* was not infrequent on the blossoms of white *Compositae*. I took one female of *Andrena morio* in fine condition.

The Coleoptera taken by me at Oulx included *Chrysomela graminis*, L., *Cryptocephalus aureolus*, Suf., *Cetonia aurata*, L., *Clytus arietis*, L., *Phyllobius argentatus*, L., *Anisoplia agricola*, Poda., *Geotrupes laevigatus*, Fabr., *Phyllopertha horticola*, L., *Cleonus sulcirostris*, L., etc.

The most noticeable amongst the Rhyncota was *Cercopis sanguinolenta*.

From larvae brought home from Oulx I bred *Zygnaena storckadis*, *Strymon spini*, *Aglaope infausta*, and others. The whole trip was a very enjoyable one.

Amongst the Hymenoptera I took at Oulx was a peculiar female specimen of the genus *Psithyrus*. Dr. Waterston and Mr. O. W. Richards kindly examined this specimen for me. They have decided that the specimen in question is *Psithyrus barbutellus* form *maxillosus*, Klug, whose range is north-west Italy. Dr. Waterston regards *maxillosus* as a sub-species of *barbutellus*, and apparently there is no

difference in the genitalia of the male. He adds "the most unusual feature about my specimen is the yellow at the tail."

The Museum Collection is short of this sub-species. Dr. Waterston states that the museum would be glad of some specimens from collectors visiting that district. I hope to go to Oulx again before long and shall keep a sharp look out bearing the museum's need in mind.

NOTES ON COLLECTING, etc.

SOME TINEINA IN FREIBURG.—At the end of April and first half of May, 1928, I was in Freiburg-in-Breisgau and on several occasions visited the Schlossberg, on the edge of the Black Forest, about 1000 feet up. There is here a number of trees of the genus *Acer*. *A. pseudoplatanus* and *A. platanoides*, form avenues, while *A. campestre* occurs sparingly as a small tree and also in the hedges beside the vineyards. I was anxious to become acquainted with *Lithocolletis geniculella*, one of the numerous and interesting additions made by Professor Waters to the British Fauna.

I found *Lithocolletis sylvestra* was not uncommon but its near ally, *A. geniculella* was rather scarce, possibly the latter emerges later than the former. The other species of this genus noticed were, *L. tristrigella*, *L. cerasicolella*, *L. quercifoliella*, *L. roboris* and *L. cramerella*.

Micropteryx ammannella was first seen on the leaves of lime in the sunshine, but on dull days some were noticed on tree trunks, walking about on their long legs, a habit, I have not before observed in any species of this genus.—ALFRED SICH. (F.E.S.)

COLIAS CROCEUS IN SUSSEX.—On August 21st I took a fresh specimen of *C. croceus* near Washington, and on the 22nd I observed several on the railway bank between Preston Park and Hassocks. Yesterday (August 30th) the same species was flying abundantly in the same locality near Washington, mostly fresh, and nearly all males; of the two females, that I took, one was of the pale form *helice*. I have never seen this species in such numbers in England, and only once abroad, on the Lido in May, 1923.—GEORGE WHEELER (Rev. G., M.A., F.E.S.) "Ellesmere," Gratwicke Road, Worthing.

HYLOICUS PINASTRI AB. ALBICANS, AUSTAUT.—In the *Ent. Record*, 1926, XXXVIII. 65. I described an aberration of this species from Suffolk as ab. *albescens*. What appears to be the same form had been described by Austaut from Wurtemberg in the *Ent. Zeitschr.*, 1906, XXI. 119, and my *albescens* must be sunk as a synonym. In the same article I stated that I knew of only one specimen of *unicolor* described and named by Tutt, but I have been informed by Herr. Karl Andreas that he has bred a considerable number from German larvae.—E. A. COCKAYNE (D.M., F.E.S.), 116, Westbourne Terrace, W.2.

REVIEWS AND NOTICES OF BOOKS.

THE SOCIAL INSECTS. Their Origin and Evolution.—By William Morton Wheeler, Ph.D., Sc.D., LL.D. Professor of Entomology at Harvard University. Kegan Paul, Trench, Trubner and Co. Ltd., 21 - net.—This is one of the most interesting books we have read of late years. It consists of the revised substance of twelve lectures given by the world-famed author at the University of Paris in the year 1925. He says in the first chapter, "The Scope and meaning of the Social among the insects," that "the study of the social insects has at the present time, a peculiar interest to the serious student of philosophy, sociology, and animal behaviour. Since we ourselves are social animals, the philosophically inclined cannot fail to find food for thought in the strange analogies to human society, which continually reveal themselves among the wasps, bees, ants and termites." He goes on to say, "Moreover, the very elaborate social behaviour of the insects, in that it is almost exclusively determined by the reflexes, tropisms, and the so called instincts and not by intelligence, assumes great theroretical significance, when we contemplate the present anti-intellectualistic and relativistic tendencies and currents of European and American thought."

Four preliminary questions are dealt with, *viz.*, "What are the social insects? Can they be shown to have had an evolution? If so what are its peculiarities? To what general causes may we assign this evolution?"

One is struck by the vast number of terms which have been coined, by myrmecologists in particular, to name the phenomena, characteristics, conditions, etc., of animal existence. Wheeler mentions that Deegener has described and named no less than 93 forms of animal association, all supplied with scientific terms of which "heterosymphagopaedium" and "amphoterosynthesmium" remind us of the reputed names of some places on the British Islands.

The mass of facts brought together by the author, and the most suggestive comments on these facts cannot be adequately dealt with in a short notice like this, and it seems invidious to select some items more than others, when all are so intensely interesting.

Chapter II. "The Origin of the Terebrantia and Aculeata," is a deeply technical discussion as to the value of the work of those who have tried to arrive at the phylogenetic origin of the Hymenoptera as a natural group. Of the three suborders the Phytophaga (sawflies and horntails) are generally acknowledged to be the more primitive, while the Terebrantia (parasitic and gall-producing species) and Aculeata (wasps, bees and ants) the more recent and highly specialised. As a result of the recent researches of Tillyard with the wonderful mass of fossil material from the Australian region, "The hypothesis of a Protoblattoid origin of the order Hymenoptera will have to be abandoned, and we shall have to assign it a place at the head of the Hexapod series, among the modern members of the Panorpid complex, the Lepidoptera, Diptera and Mecoptera (Panorpatae)." The greater part of the chapter deals with the various grades of parasitism exhibited in the Terebrantia with a few from other orders of insects.

Chapters III., IV., V. and VI. deal respectively with the evolution of wasps, bees, ants and termites. These chapters are replete with

accounts of many remarkable facts in insect economy. 'Tis remarkable to read that the chalcid, which runs its ovipositor through the cocoon of a beetle and the space between the cocoon and the pupa and into the latter, leaves the organ in this position for half an hour, while a secretion hardens around it and forms a delicate tube, through which the parasite sucks the blood of the prey as soon as the ovipositor is withdrawn. The conclusion arrived at is that "the social Aculeates are derived from solitary Sphecoids and Vespoids."

The fundamental solitary traits of character, both structural and behaviouristic, most noticeable are: (1) The sexual dimorphism. "The complicated instinct patterns are exhibited only by the female, and the male is reduced to a mere fecundating agency." The male is the conservative sex, the female alone is subject to the full incidence of environmental stimuli and is able to advance along the path of progressive specialisation or adaptation. (2) The storing of food for the offspring by Vespoids and Sphecoids may be regarded as a prospective or potential social activity. (3) The nest, ranging from a simple burrow to a carefully constructed cell. (4) The development of defence reactions. The ovipositor becomes a sting. The efficiency of the mouth organs from seizing prey to biting in defence.

Chapters VII. and VIII. Polymorphism. The term is here restricted to a consideration of those cases in which two or more different kinds of individuals of the same species co-exist. The evolution of the various "castes" is discussed and of other forms, which may be termed regular, as well as the curious irregular forms, gynandromorphs, intersexes, mosaics, etc., of which Donisthorpe has given a short account in *British Ants*, ed. II. 1926). The investigation is the more difficult, as the intensive work of Tillyard on the fossil remains of the Hymenoptera has shown "the extraordinary stability of the typical castes among existing species of ants and termites and their extraordinary constancy during geologic time."

Chapter IX. The Social Medium and Trophallaxis. The activities concerned are (1) the nuptial or dissemination flight; (2) nidification; (3) foraging and storing of food and its distribution among members of the colony; and (4) defence. The author considers at length only the tropic behaviour (activity regarding nutrition) to which all other activities of the colony are really ancillary, with particular reference and discussion of Trophallaxis, that remarkable habit of exchange of food. Incidentally the notion of "instincts" is decried and this portion of the book is in places, quite amusing with the various tilts the author has with his critics especially "the Jesuit instinct mongers," of which that clever observer Wasmann is the chief. The discussion of celibacy, of which that of ants, bees, and wasps is a perfect example, is introduced and compared with the human attempt. The chapter concludes with a statement of the important rôle of olfaction in the reciprocal behaviour of the social insects, a phenomenon hitherto inadequately considered.

Chapters X.-XI. deal with the Evolution of the Guests and Parasites of the Social Insects, and the still further Evolution of the Social Parasites, where colonies of parasites, exist in colonies of social insects. It is often said that comparisons are odious. In a note an example is given of extreme human parasitism, which we quote in full. "Spain,

at the end of the past century, may be regarded as the type of a community reduced to a kind of economic phthisis through the development of parasites and insufficiently productive workers. Under Philip III. there were 988 convents for women and 32,000 mendicant friars; the number of monasteries had tripled during the fifty years preceding 1624, and the number of monks had increased in even greater proportion. The census of 1788 gave a total of 1,221,000 priests, soldiers, sailors, nobles, lawyers, government clerks, students and servants in a population of about 3,800,000, from which we should still have to deduct a mass of beggars, vagabonds, etc." The phenomenon known as "slavery" is discussed at length; the term is pointed out as a misnomer to a great extent and the author would prefer the term "auxiliaries" as more expressive of the relationship, which in many cases is only temporary, and the "slave" may often become the dominant.

Chapter XII. Conclusion. A summary of the lines of evolution pointed out in the previous chapters. Much of the result of his studies the author applies to human affairs. To put it brutally he says "Our political bodies, universities, academies, churches and other institutions contain far too many old incompetents, and as Goethe said to Eckermann, our state funerals do not succeed one another with sufficient frequency. And the conditions become the more intolerable, the more advancing medical science prolongs human life and increases the population in general and the number of old fools in particular. How differently the problem is solved by the social insects."

In his final comments on the behaviour of civilised man that, "Having exterminated nearly all the primitive human societies and nearly all the Mammalia, except the few he has been able to domesticate, he is now engaged in destroying much of the remainder of the life of the planet," the author foresees that he "will exterminate the terrestrial fauna and flora, except the portions from which he can derive some benefits. But the most prolific and resourceful ants will remain as his annoyers and competitors and will probably be among the last insects to disappear." Apparently he allots final survival to man and not as did another modern author, who predicted *The End*: When the moon shall have faded out from the sky, and the sun shall shine at noonday a dull cherry-red, and the seas shall be frozen over, and the ice-cap shall have crept downward to the equator from either pole, and no keels shall cut the waters, nor wheels turn in mills, when all cities shall have long been dead and crumbled into dust, and all life shall be on the very last verge of extinction on this globe; then, on a bit of lichen, growing on the bald rocks beside the eternal snows of Panama, shall be seated a tiny insect, preening its antennae in the glow of the worn-out sun, representing the sole survival of animal life on this our earth; a melancholy "bug."

There is a Bibliography of 38 closely printed pages and an Index of 18 pages of small print giving not only the names of the species mentioned but that of the authors and of the phenomena. There are 48 plates, each with numerous figures. In fact the matter is quite adequately presented by both author and publisher. To an intellectual reader the book is a novel of the greatest interest and should be read not only by the lover of nature but by the student of human nature in particular.—Hy. J. T.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—Several hundred species of Coleoptera (carded) from Hants and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Duplicates.—British Lepidoptera, many species.

Desiderata.—Back volumes of Trans. Ent. Soc. Lond., and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of *christyi*, *abruptaria* v. *brunnea*, black *consonaria* and *bidentata*, *andreasaria*, *curzoni*, *jasionata*, *venosata* (Shell.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. *Herminia flavicrinails*, *Andreas*, *Nych. dalmatina* race *andreasaria*, *Warnecke*, about 30 species of rare *Acidalias*; pupae of *Eupithecia illuminata* or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

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Duplicates.—Fine bred *prunaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), *Tenthredinidæ* and *Aculeates*.

Desiderata.—Species of *Dolerine* and *Nematine* sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Bred *Sparganii*, *Ochroleuca*, *Maritima*, *Straminea*, and many other Noctuae.

Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytoecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 3rd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Sept. 27th. Oct. 11th. 25th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

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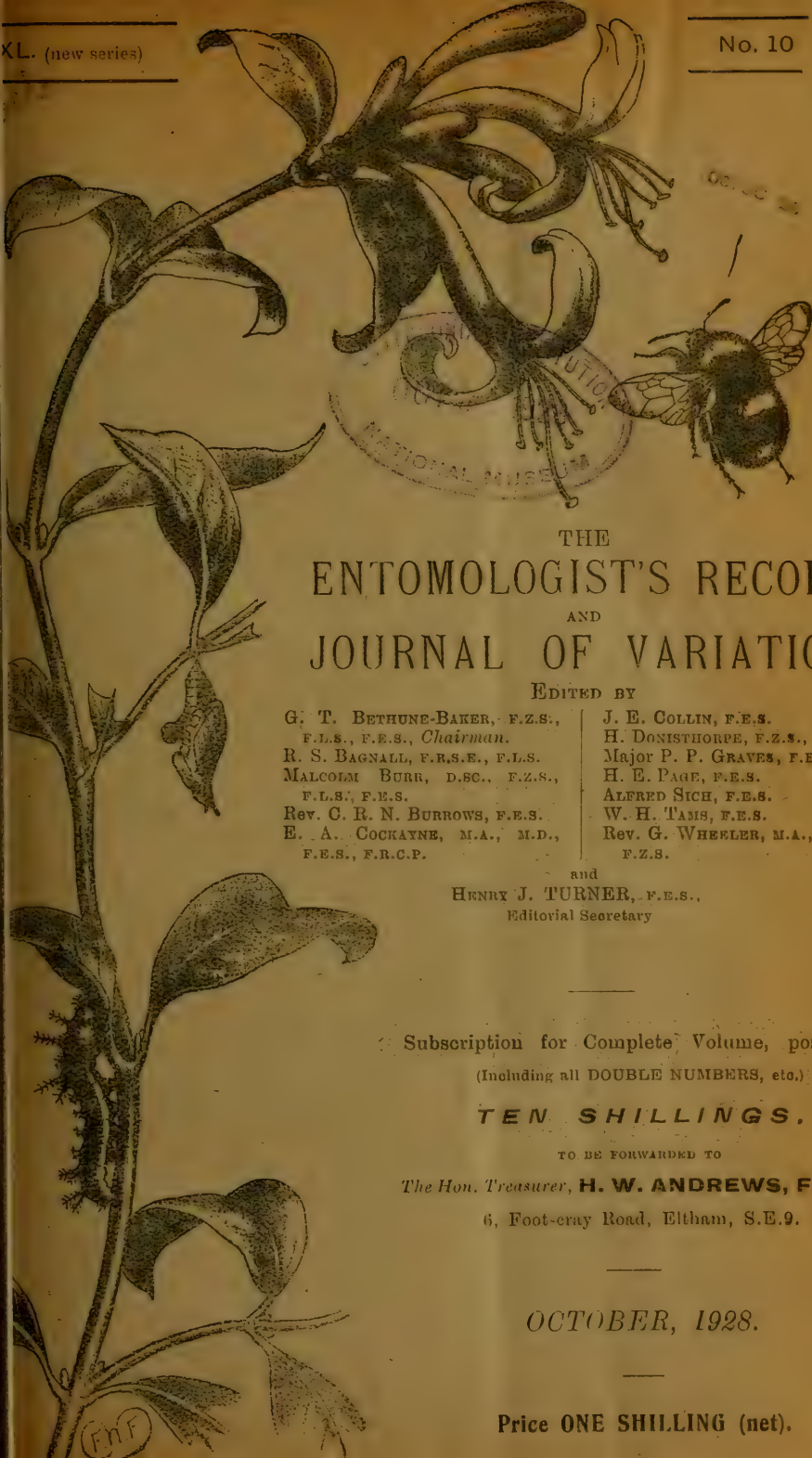
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Descriptions of New Species of Noctuidae (Hadeninae).

(Continued from page 105.)

By A. E. WILEMAN, F.E.S., and R. J. WEST.

Collected by A. E. Wileman in the Philippine Islands, the types being in the Wileman collection. "Ridgway" has been used as the standard for colours. Colour terms in italics are not Ridgway's. Patagium=collar-tippet. Tegula=wing-base-covers.

HADENINAE.

Elusa alector, sp.n.

Male.—Palpus: wood brown, outwardly fuscous tinged with russet. Antenna: ciliated, with paired setae. Head: frons and vertex wood brown. Thorax: wood brown, fuscous black tinged with russet on metathorax, patagium and tegula wood brown anteriorly, tinged with russet posteriorly. Abdomen: hair brown above, ventral surface wood brown, anal tuft wood brown tinged with russet. Pectus: wood brown. Legs: wood brown, femur of fore-leg thickly scaled with fuscous tinged with russet, tibia of hind-leg has large tuft of scales and hair-scales, light to warm buff tinged with russet. *Forewing*: liver brown shaded with fuscous, two fuscous spots outlined with drab grey, one each at upper and lower angles of cell; underside light drab. *Hindwing*: upperside light drab suffused with fuscous, underside light drab.

Expanse 22mm. (tip to tip 20mm.).

Female.—Similar, but differing in the antennae, of which cilia are much shorter.

Expanse 24mm. (tip to tip 22mm.).

Holotype. Male. Palali, subprov. Benguet, Luzon, I., 2,000 ft.

28.XII.1912.

Allotype. Female. " " " "

26.XII.1912.

Paratype. Female. Baguio, " " "

12.XI.1912.

Nearest ally *E. diloba*, Hmps. (Borneo).

Miselia luminosa, sp.n.

Male.—Palpus: thickly scaled with a mixture of warm buff and neutral red scales, with a sprinkling of fuscous black. Antenna: shaft drab, each segment of basal half ochraceous buff above and ringed with fuscous, ciliated with paired setae. Head: frons and vertex pecan brown tinged with neutral red. Thorax: clothed with light buff hair-scales tipped with neutral red; patagium, pecan brown tinged with neutral red anteriorly; tegula pecan brown tinged with neutral red. Abdomen: drab grey tinged with fuscous on basal segments, and fuscous patch on anal segment, venter pecan brown tinged with neutral red, anal tuft warm buff tinged with pecan brown. Pectus: drab. Legs: coxae, femora and tibiae neutral red mixed with fuscous, tarsal segments clove brown, joints ringed with light buff. *Forewing*: pecan brown with suffusion of warm buff near inner margin, and suffusion of neutral red above median nervure, orbicular outlined with velvety fuscous black, reniform suffused with warm buff

and outlined with warm buff and velvety fuscous black, which extends to postmedial fascia as a short dash; claviform mark outlined in fuscous black; antemedial fascia wavy, warm buff edged with fuscous black; postmedial, excurved, crenulate line of fuscous black and warm buff, commencing with a small, warm, buff patch at costa; subterminal fascia irregular, interrupted, warm buff preceded by a series of indistinct, interneural, fuscous, sagittate marks (points basad); a broad, ill-defined fuscous bar from postmedial nearly to termen, on, and on each side of, vein 5, but not touching 4 or 6; a terminal series of velvety, fuscous black lunules; fringe pecan brown, warm buff at base succeeded by a zone of neutral red. Underside: fuscous bordered with neutral red, postmedial and subterminal bands indicated, pale along inner margin and with a streak of warm buff below costa at basal third. *Hindwing*: light buff suffused with fuscous, veins fuscous, and area beyond postmedial more strongly suffused with fuscous; underside, lower half light buff, upper half suffused with neutral red, subterminal band fuscous, postmedial fuscous, strongly indicated from costa to vein 6, a diffuse fuscous discocellular lunule.

Expanse 44mm. (Tip to tip 42mm.)

Holotype. Male. Haight's Place, Pauai, subprov. Benguet, Luzon, I., 7,000 ft. 8.XI.1912.

Nearest ally *M. pannosa*, Moore (India, Ceylon).

***Cirphis lipara*, sp.n.**

Male.—Palpus: light buff, tinged with snuff brown above. Antenna: ciliated, with paired setae, light buff on basal quarter. Head: frons light buff, fuscous laterally, vertex light buff, tinged with snuff brown. Thorax: light buff, patagium light buff tinged with snuff brown, with two narrow transverse bands of fuscous black, snuff brown posteriorly, tegula light buff tinged with snuff brown, with a few fuscous black scales. Abdomen: light buff, with basal dorsal crest tinged with snuff brown, venter light buff, with fuscous black patch wide at base, diminishing to a point posteriorly, and a fuscous black spot on sides of each of segments 6 to 8, anal tuft light buff. *Forewing*: snuff brown, with cartridge buff band on and below costa, and veins 6 to 12; white on median nervure at distal half of cell, continuing along veins 3 and 4; area below cell up to postmedial fascia cartridge buff tinged with snuff brown (except just at wing-base), sparsely irrorated with a number of scattered fuscous black scales; a white and cartridge buff, diagonal, wedge-shaped fascia from apex, widest at inner margin between medial and postmedial fasciae, its outer edge overlapping the postmedial series of fuscous black, interneural points from vein 5 to anal vein; area between this line and termen snuff brown; interneural fuscous black spots on termen. Underside: cartridge buff overlaid with opalescent scales; upper half suffused with pinkish vinaceous, a prominent fuscous black spot on costa between end of cell and wing-apex, a trace of the diagonal wedge-shaped fascia, and a terminal series of interneural fuscous black points. *Hindwing*: upper-side cartridge buff suffused with fuscous between veins 2 and 6; underside cartridge buff overlaid with opalescent scales, with a few fuscous scales on discocellulars and between them and wing-apex.

Expanse 36mm. (Tip to tip 35mm.)

<i>Holotype. Male.</i>	Haight's Place, Pauai, subprov. Benguet, Luzon, I., 7000 ft. 30.XI.1912.
<i>Paratype. Male.</i>	" " " " " 26.VII.1913.
<i>Paratype. Male.</i>	" " " " " 28.VII.1913.
<i>Paratype. Male.</i>	Baguio, subprov. Benguet, Luzon. 5000 ft. 1.IV.1913.

This species is similar to *C. decissima*, Wlk., but differs in having the diagonal line from apex more sharply defined, and the white scaling on median nervure and veins 3 and 4 is more extensive.

***Cirphis albomarginalis*, sp.n.**

Male.—Palpus: cartridge buff, with fuscous above. Antenna: ciliated, with paired setae. Head: frons and vertex cartridge buff and fuscous mixed. Thorax: cartridge buff, a tuft of pale drab grey speckled with fuscous hair-scales on mesothorax; patagium, cartridge buff anteriorly, edged with fuscous, cartridge buff tinged with wood brown posteriorly, tegula cartridge buff tinged with wood brown with a few fuscous black scales intermixed. Abdomen: drab with prominent fuscous crest on basal segment, other crests cartridge buff; venter cartridge buff, with a row of three half hidden fuscous spots at sides; anal-tuft cartridge buff. Pectus: cartridge buff. Legs: foreleg cartridge buff with fuscous inwardly, other legs cartridge buff speckled with fuscous, fuscous on spurs. *Forewing*: wood brown, cartridge buff band along and below costa, with scattered fuscous scales and three fuscous spots on costa, sub-basally, antemedially and postmedially; veins 6 to 12 cartridge buff, distal two thirds of cell cartridge buff lightly irrorated with wood brown, orbicular faintly marked by a wood brown spot, reniform ill-defined by fuscous; median nervure white, the white continuing along veins 3 and 4; a diagonal fascia from apex to inner margin at two thirds, from apex to vein 5, broad, cartridge buff, continuing as a broken row of postmedial fuscous dots; interneural, fuscous spots on termen; cartridge buff patch near tornus: underside cartridge buff, with scattered fuscous scales below costa, fuscous mark on discocellulars, a broken, fuscous, postmedial band with a fuscous spot at costa, a fuscous postmedial to subterminal patch between veins 2 and 5. *Hindwing*: fuscous, cartridge along costa and cilia; underside cartridge buff sparsely irrorated with fuscous; fuscous mark on discocellulars, fuscous dots on veins postmedially, interneural fuscous dots terminally.

(*Expanse* 38mm. (Tip to tip 36mm.)

Female.—Similar to male, slightly paler.

(*Expanse* 38mm. (Tip to tip 36mm.)

<i>Holotype. Male.</i>	Haight's Place, Pauai, subprov. Benguet, Luzon, I., 7,000 ft. 12.V.1913.
<i>Allotype. Female.</i>	" " " " " 7,000 ft. 13.I.1912.
<i>Paratype. Female.</i>	Baguio, subprov. Benguet, Luzon. 5,000 ft. 20.IV.1912.
<i>Paratype. Female.</i>	" " " " " 1.V.1913.

My wife and I spent ten days at Finhaut (on the Chamonix Châtelard railway) from August 6th to 16th and on August 7th on the Col des Montets we first noticed that a steady migratory flight of *croceus* was taking place. Up on the hill side to the west of the Hotel Col des Montets, during an interval of half an hour in the afternoon, a couple of hundred *croceus* must have passed the place where we were standing, usually in batches of three or four, all going in a south-westerly direction towards Chamonix, which as it happened was against the wind. Among the specimens seen were quite two dozen *helice*. From this locality we walked back over the Col to le Buet station, and all the way the flight of *croceus* continued. It was only very occasionally that one saw a specimen settle for a moment, and I do not think a single one was seen flying in the reverse direction. For the next nine days wherever we went in the valley between Finhaut and the Col des Montets, the continuance of the regular flight of *croceus* up the valley was observed. For the purposes of collecting I found it simplest to stand at a given spot and catch what came by, or try to, for the flight was often very wild. On August 14th, just below Flégère, above the valley of Chamonix, at about 6000 ft., during the interval while we had lunch, several dozen *croceus* passed within twenty yards of where we were sitting, and at one time six *helice* inside a quarter of an hour. This was on the west side of the Chamonix valley; on the other (east) though quite a number of *croceus* were seen they were not flying continuously or in any particular direction. In the valley between Salvan and the Col des Montets the migration seemed to be confined to the west side also.

The number of *helice* seen during the ten days must have exceeded a hundred, at the least, with a considerable range in colour, from pure white to a bright lemon yellow, a few being a beautiful cream colour.

After we left Finhaut we spent a few days at Zinal. *Croceus* was plentiful at Sierre and all the way up the valley to Zinal, but here there was no apparent inclination to migrate. Quite a number of specimens were seen at 7000 ft. on the path to the Col de Sorbois.

At the present date (September 20th) specimens can still be seen in the streets of Lausanne, but not frequently.

A note on some Predaceous Hemiptera.

By J. SNEYD TAYLOR, M.A., D.I.C.

(Government Entomologist, Barberton, Eastern Transvaal.)

Perhaps the commonest local species of *Reduviidae* is *Harpactor segmentarius*, Germ. It is frequently to be met with in the cotton fields, searching for bollworms and other Lepidopterous larvae upon which it feeds. It will also attack the cotton stainers (*Dysdercus*), for one of which, namely *D. nigrofasciatus*, Stal., it is often taken by farmers owing to its somewhat similar coloration.

A female of *H. segmentarius* recently deposited a batch of ninety eggs upon the wall of my house. The egg is elongate and cylindrical in shape, about 2.5 mm. in length, and of a light brown colour. It stands upright upon one end, and at the other end is a dome shaped operculum, or lid, which is marked off from the rest of the egg by a

dark encircling line bearing numerous little vertical projections, the chorionic processes. Surrounding, and overtopping the apex of the lid is a layer of a white viscid substance, which has the appearance of paper. In it the eggs, which are closely packed together, are embedded. Viewed from above the batch of eggs has a honey-comb appearance due to the presence of this sticky material and their alternate arrangement. The eggs hatched in 13-14 days. The nymph pushes its way out from under the operculum. It is blackish in colour and in shape very slender but the abdomen reddens, and swells considerably after feeding. I fed the nymphs, which are most voracious, upon young Lepidopterous larvae, Aphids, and young Pentatomids. On finding a victim the young Reduviid would raise its front pair of legs above its head, at the same time elevating its proboscis, then pounce forwards with its feet upon the prey simultaneously thrusting its proboscis into the latter, which would struggle violently for a moment before dying. The whole operation was a most rapid one. The Reduviid would then proceed with its meal. Sometimes two or three individuals would pounce upon one young caterpillar at the same moment, when a violent tug of war would take place. When the food supply was short it was no unusual sight to see one of the nymphs, which had secured a caterpillar, being pursued round and round the breeding jar by its less fortunate brethren. The nymphs would not hesitate to attack larvae much larger than themselves. It is necessary to handle the adult with caution if one would avoid a painful jab of the proboscis in one's finger.

Another species found in similar situations, but not so commonly, is *Rhinocoris (Harpactor) albopunctatus*, Sb. *Coranus papillosus*, Thunberg, a smaller species has been observed in cotton fields; while *Physorhynchus cruzi*, Thunberg, a large thickset, and dull coloured species has occasionally been found in gardens.

Of the *Pentatomidae* I have observed two predaceous species in the vicinity of cotton fields. The commoner of the two is *Macrorhaphis spurcata*, Wlk. It has frequently been seen preying upon the various bollworms and other Lepidopterous pests of cotton. The nymph is bluish black, with scarlet markings. It is not an entirely predaceous species as it appears to be able to live upon plant juices, as well as upon insects.

The other species is *Glypsus conspicuus*, Westw., which has similar predaceous habits.

Zygaenae, Grypocera and Rhopalocera of the Cottian Alps compared with other races.

By ROGER VERITY, M.D.

(Continued from Vol. XXXIX., page 175.)

Nytha aethusa race *seguisiana*, Frbst.—I must mention the species because Frühstorfer has described this race from two males of the Susa Valley in the Blachier coll., but the exact locality he does not give.

Limenitis ricularis race *herculeana*, Stichel.—Oulx (males on the wing at the end of June; the females emerge during the second week of July and live till the middle of August); Cesana. Stichel's name

applies to this race, although it is a trifle less gigantic and it has white spaces less broad than in the race I have collected at Trieste and at Portorose, in Istria, identical with the original figure; Gravosa, in Dalmatia, and Digne are given as the localities of the "types." From the Mainarde Mts. in Southern Italy I have still larger specimens than the latter (female 50mm. between the apexes when the forewings are set so that their hindmargins are exactly in a straight line), the males, there, measuring 40 to 48mm. and the females 50 to 53. The smallest race I have met with is that of Quercianella, a very parched locality near Leghorn, where the males of the third generation measure about 36mm. and the females 40mm., but which have such narrow wings that their surfaces are not more than half those of *herculeana*: *pygmaeana*, mihi.

Melitaea maturna exerge *cynthia*, Schiff., race *pallida*, Spuler.—Oulx (one male on August 6th and one female on July 28th, both freshly emerged and feeding on thistle in a very hot, stoney spot, most unusual for this species, together with the low altitude of 1100m.) ; Clavières (both sexes abundant on grass patches in the bed of the torrent on July 29th) ; Sestrières. This race, characterised by its very pale underside and described from the Pesio Valley, in the Piedmontese Maritime Alps, south of Cuneo, seems to spread to the whole of the Western Alps. At the Vallasco, m. 1700, in the Maritime Alps, it is larger and the male is more broadly white than in any other locality I have seen it from; the female form tending towards the white of the male, as recorded by Wheeler from "above the Simplon," has been described from the Vallasco by Turati and myself as *variegata*, and that with the dark bands effaced to a considerable extent as *mundata*. The relationship of *cynthia*, Schiffermüller (not Hübner, as usually stated), and of *iduna*, Dalm., to *maturna*, L., is extremely interesting. They apparently stand to it very much as *glarieggenita*, Vrtý., stands to *M. aurinia*, but *iduna* and *maturna* are connected in Siberia by numerous transitions and *cynthia* is presumably a variation analogous to *iduna*, which has been produced in Europe comparatively lately, during and since the Pleistocene glaciations, so that it is very unlikely it should already have attained a specific degree of differentiation.

Melitaea aurinia exerge *merope* (including race *provincialis*, B.) race *merope*, De Prunner.—Oulx (a few worn females at the end of June and on July 6th, on thyme flowers around the powder magazine of the rifle range. I probably missed some, mistaking them on the wing for ragged *cinxia* amongst which they were flying).

Melitara cinxia race *arelatia*, Frhst.—Oulx (some individuals of both sexes very worn and others perfectly fresh at the beginning of July) ; Cesana ; Clavières : all very worn on July 29th. Frühstorfer described this race in the *Ent. Zeit.* of October, 1910, from the Plateau d'Emparis, near La Grave, at 2200-2400m., in the Dauphiné. It is strikingly small in size, of a dull, pale fulvous on both surfaces and with broad black markings ; one extreme melanic female of Oulx has the fulvous replaced by yellowish white and others are transitional to it. All considered, I think Frühstorfer was perfectly right in making a distinction between this culminating alpine race and the form named *pallidior* by Oberthür in June, 1909, from a few individuals of the Maritime Alps and of Digne. The race of the Baths of Valdieri is, in fact, of a rather peculiar dull, clear fulvous, and it has in many individuals broad black markings, but it is always larger and never whitish

in the females; they resemble in some cases Herrich-Schäffer's fig. 269, quoted by Oberthur as very similar to his most melanic female, showing that is the race his name applies to, only transitional to *ardelia*. The race of the Altai, named *tshoujaea* by Seitz in August, 1909, is very probably just the same as *ardelia*, judging by the exact resemblance of many races of our Alps to those of the Altai, such as in exerge *glaciegenita*, Vrtý. (= *merope* auctorum nec de Prunner) of *M. aurinia*, but, before asserting it, series of specimens must be compared. *M. cinxia* does not produce anything like the striking geographical races and exerges of most other *Melitaea*. The nymotypical one of Scandinavia is small and of a bright, clear fulvous, with a thin black pattern. In the whole of France one usually meets with a form which only differs from the preceding by its slightly larger average size, so that one is scarcely justified in distinguishing it and utilising the name of *pilosellae* given by Rottemburg to the Parisian insect described by Geoffroy and figured very well by Esper, pl. 47, fig. 3. The most important feature of this race is that it produces very often a partial second generation, of minute size, *phaira*, Frühst., which never occurs either in Scandinavia or in Italy. On the French Riviera and in Italy there exists a still larger race, of a warmer fulvous, with a marked reduction of the black pattern, which is often partially obliterated on the forewings: race *australis*, Vrtý., 1916 ("Florence") = *narbonensis*, Frhst., 1917 ("Riviera"). Races *sicula*, Ragusa, of Sicily, and *castiliana*, Turati, of Castile, are local variations of the latter of smaller size. From the Mt. Dore, in Auvergne, Frühstorfer describes a perfectly constant race of very small size, in which the female has part of the forewing and all the hindwing thickly dusted with green: *gergovia*. In England and in the damper regions of Central Europe, which become quite prevalent in its eastern portion, the average aspect of *cinxia* becomes much darker, owing to an increase in the extent of the black pattern and also to a deeper and richer, but less bright, tone of colouring. The race of Vienna is highly characterised in this sense so that the name of *delia*, Schiffermüller (nec Borkh.), comes in useful to distinguish this form, figured by Esper as *cinxia-major*, pl. 25, f. 2, and by Seitz as typical *cinxia*, together with the particularly dark female form which he names *obscurior* and which is not infrequent in Austria and Hungary, where all the *Melitaea* and *Argynnis* assume a dark appearance. The meaning and validity of Schiffermüller's name cannot be put in doubt, because he quotes Rösél's pl. 18, fig. 4. Lastly I must mention the very distinct and handsome race *terraccina*, Frhst., described from Carniola, and also Bosnia, and to which the race of the Carso, above Trieste, certainly belongs: its chief feature is that all the white areas of the underside are replaced by light yellow, including the central row of spaces of hindwing, which in other races remains of a silvery white also in the individuals in which the rest is tinged with yellow; by its large size and bright colouring it stands very near *australis*, but the black pattern is distinctly less reduced and there occurs frequently amongst the *australis*-like females a contrasting form, very similar to the dark *delia*, with a broad greenish grey suffusion and a whitish ground colour on upperside. The race of the Isarco's hot valley, in S. Tyrol, is quite *australis*, but with a slightly lesser tendency to obliteration of the dark pattern.

(To be continued.)

Field Notes from Angola, X.

By MALCOLM BURR, D.Sc., F.E.S.

JULY 27th, 1927.

The season is passing on and I notice no change in the fauna since there was a considerable development of mature Acridians late in June. The nights are cold and there is little sign of insect, or other, life after dark, and all we hear is a very occasional cricket about dusk. These are elusive creatures and it is exceedingly difficult to trace any particular stridulation to its author. There are other mysterious sounds which I attributed to crickets for a long time, but have now decided that they are due to frogs and birds; the plaintive wail which I occasionally hear at different hours is certainly a bird, though I have not yet run him down; and in the marshes there are frogs with notes uncommonly like the chirp of a cricket; besides them, there is a small tree frog, which caused me to waste a lot of time before I satisfied myself that he was not an orthopteron; of cicadas I have scarcely seen or heard one.

Orthoptera, and insect life in general, are far scarcer than in an ordinary European forest in the summer, but we must remember that it is the winter here now; still, it is surprising how few Locustids there are about, how few butterflies and beetles; I have turned over logs innumerable and stripped the bark from dead and dying trees without number, but never find anything except ants or termites; except the few earwigs referred to in an earlier letter, the *Apachyus* and *Echinosoma* nymphs under the bark of a tree on the Luena, I have seen no more; at one place, Chindumba, a boy brought me a male *Karschiella*, from which he had apparently torn off the forceps, an extremely interesting creature, but I am sorry I did not find it myself; he appears to have found it in the fuel of the camp fire. *Karschiella* is clearly characteristic of the forest belt; there are four species, but they will probably have to be fused into one; the presence of rudimentary elytra distinguishes them from the totally apterous *Bormansia* of the eastern half of the continent; they are of archaic appearance, somewhat recalling the *Pygidicraniinae* and the most remarkable feature about them is that the larvae have segmented caudal setae, a very primitive feature, which, so far as is known, occurs only in one other family of earwigs, the *Diplatyinae*. It will be probably remembered how many years ago Westwood described a strange earwig-like creature with long caudal setae, which he could not place and called *Dyscritina*; about thirty years ago Mr. E. E. Green discovered it in Ceylon and succeeded in rearing it to maturity and proving it to be an immature earwig, of the old genus *Diplatys*. *Diplatys* with some thirty odd species, is found in the equatorial belt round the world, but the two genera of the *Karschiellinae* are purely Ethiopian.

A dead trunk on the ground here is a different proposition from one in Europe. If you rip up the bark, you may possibly find one of these earwigs or possibly a Hemipteron taking refuge, but in nine cases out of ten you will find it full of sand, with a crowd of ants or termites. The latter have a trick of carrying sand to a considerable height up standing, but dead, trees, which are numerous owing to the great

number of bush and forest fires; when a tree has been lying long enough on the ground, it is filled right up with sand by these industrious creatures, which leave only an outer shell of wood; this dry mass of sand seems an inhospitable home for any other type of insect; the trunks seem to settle into the sandy soil, and commonly enough you will find one with one end buried and practically absorbed into the soil, the other retaining its woody consistency while it protrudes into the air.

A favourite place for earwigs in most parts of the world is under stones but, in my experience, they always require a certain amount of moisture. Here, in this elevated Angolan forest, there is but little visible moisture and practically no stones; here and there are beds of more or less indurated sandstone, but so friable that it rubs away between the fingers; otherwise it is nothing but sand, sand, sand. The only variation is in the colour; as a rule it is deep grey, but in places pink or even deep red, as at Villa Luso. Along the banks of the streams, the narrow strip of sand between the edge of the forest and the bog is exposed to the light of the sun and bleached so white that it looks like snow. In many a dell has Pavel Stepanovich exclaimed that the scenery is more like that of the Urals than of central Africa; the oak-like trees, covered with moss and lichens in the dells, and the white strip as of young snow, make one think that it will be a bear or a wolf that will come out, and not a leopard or a lion. The whole scenery is so Central European in appearance, except that there are no conifers, that one forgets that one is in Africa, and becomes careless, till sharply reminded by stumbling on a cobra, or meeting a leopard face to face when strolling down a path. Now I have learnt wisdom, and when out with sweep-net and killing-bottle towards dusk, I am careful to have my gun-boy with me.

I fear I have been a little slack in collecting recently, but my eyes are open; I have now a general idea of the orthopterous fauna and am on the look-out for anything unfamiliar or rare. I have added no species to my notebook for sometime now, but found the desert-loving *Chrotogonus* in several localities, always on a bare strip of sand free from trees. The "burnt grasshoppers" are very general, as all the Stenobothrids on the innumerable burnt-out patches are of a very dark colour, but I have not found more of those very striking ensiform Truxalids that overdid their resemblance to their changing environment; it is foolish of them to turn black or black and bluff, when the fresh green shoots spring up and quickly change the scenery for them.

The boys, who are very discriminating and seldom bring me anything but Orthoptera, come across some interesting things when clearing the ground for camping; from time to time that small Heterodid which was commonly chirping by the Luena falls, but none of these are mature; every new camp produces one or two of that unpleasant-looking Stenopelmaticid, with its huge jaws and reptilian aspect; they are not nice to clean, for they are full of a white creamy fluid, probably as harmless as the yellow "blood" of the *Bradyporidae* and *Heterodidae*, but certainly it looks nasty. One big female, brought me by Pavel Stepanovich, was thinner in the abdomen than most of them, and when I opened her, I found no white milk, but a shell of an abdomen occupied by the coils of a parasitic worm, perhaps a *Gordius*, no less

than 25 centimetres long; it was convoluted into a space no more than one and a quarter inches long.

The most numerous insects here are termites; there appear to be several species, judging by their nests; one builds the pyramidal house familiar in illustrations of African scenery; we see little of that, which appear to be a savannah type; then there is a kind that builds an egg-shaped nest in the fork of a tree at a good height from the ground; there is a rather large kind which makes its nest, a flattish heap, on grass and bogs, but the commonest of all makes an umbrella-shaped nest; this is a common object of the woodlands and plays an important part in local economy. The nests are of a light grey colour, built in tiers of increasing diameter, the top one being about 12-16 inches across and the whole thing a couple of feet high.

In this country of loose sand, the coherent material of these nests is used in building houses, for there is no mud, and for flooring the sites of permanent camps which would otherwise be a carpet of loose dusty sand; it is used as a binding material for the motor-roads which, to the credit of the Portuguese, intersect the country freely, and the drivers curse its absence when they come to patches of soft ground in which their wheels plough up to the axle. The material of these nests which must be formed by an excretion of the insect, is doubtless a rich contributor to the soil and helps to explain the existence of substantial trees and thick undergrowth on what appears to be nothing but noncoherent grains of sand. There must be nutriment, however, in it, or the vegetation would not be there, and contractors tell me they cannot use the sand for cement without washing it, so there is probably a film of nourishing matter around each grain; perhaps it is the local absence of such matter here and there that accounts for the survival of barren patches in the forest, where the old desert fauna has been able to linger on, as well as on the desert strips that form the edge between the forest and the river bogs. So we must not consider the termites only as a nuisance to the owners of wooden houses and furniture, but really as benefactors. They perform also an interesting role in the geology of the country.

Since the turn of the moon, the wind has been less persistent and the nights milder, a great relief. The occasion is celebrated by nocturnal birds and insects and once again I hear Locustids striking up at dinner time. I have been on the lookout for *Mecopoda*, for the Chinese are said to keep these in cages for the sake of the song, which I was anxious to hear. The boys had brought me occasional species during the past two months, all adult, but I had not taken it myself till recently. But one mild evening, while chatting round the camp fire with Pavel Stepanovich, my ear caught a distant chirp; I took electric torch, stalked it down and returned in triumph a few minutes later with a *Mecopoda* in my hand. The distance was about eighty yards, so the sound is penetrating, though far from loud; it is a curious, shivering, not unmelodious note. The creature was sitting on some dried wood, head downwards like a *Locusta*, and was sufficiently bold to allow me to catch it with my fingers. He is a fine fellow, something like our familiar *Locusta viridissima*, but a good deal bigger, with very ample, broad elytra, and of a mottled dark brown colour; for this reason I suspect he normally frequents dry and not green wood. I was very pleased to make his acquaintance.

CURRENT NOTES AND SHORT NOTICES.

The parts of the *Catalogue of Indian Insects* issued, in sections as completed, by the Government of India, have reached pt. 17. It will be found particularly useful on account of the mass of bibliographical references and the lists of localities and areas appended. "The fauna of India does not constitute a unity," for several species from the palaearctic region and also other tropical areas are found in India. Recently we have received Part 13 *Cicindelidae*, 140 pp., Pt. 14 *Palpicornia*, 150 pp., Pt. 16 *Cosmopterygidae*, 36 pp., and Pt. 17 *Yponomeutidae*, 28 pp. The last two are by T. Bainbrigge Fletcher, F.L.S., F.E.S., the Imperial Entomologist at Pusa.

The *Naturalist*, the Journal of the London Natural History Society, for 1927 has been issued. It contains a considerable amount of Natural History matter, but the entomological records are limited to about a single page, with the addition of an excellent plate, "A Gathering of *Pieridae* and *Papilionidae* on Damp Sand, Matto Grosso, Brazil," from a photograph by C. L. Collenette, F.E.S.

We have received, by the kindness of M. Henri Gadeau de Kerville, the veteran naturalist and explorer, a volume, *Voyage Zoologique en Syrie*, giving an account of a journey made in the spring of 1908. The volume was delayed in publication owing to the war. It contains a short account of the districts, Beyrout, Damascus, Baalbec, Cedars of Lebanon, etc., with 20 excellent photographs and 2 maps. No less than thirteen specialists deal with the various orders collected and their reports are included with 15 further plates and numerous text figures, mostly concerning new species. Two plates of Paraneuroptera are coloured and there are two excellent plates of Diptera. Neither Coleoptera nor Lepidoptera are dealt with. Considerable attention was given to the collecting of Land and Freshwater Crustaceans, Arachnids, Myriapods and other little-worked and more obscure orders, and this adds considerably to the permanent zoological value of the work. The volume is well printed and produced by the publishers, J. B. Ballière et Fils, Paris.

The *Rochester Naturalist* is now published at intervals. In the present issue No. 131 there is a very full "List of the Hymenoptera of the Rochester District," by G. E. Frisby, F.E.S. It includes all sections, sawflies, ants, ichneumons, bees, etc., with closer locale for the less common species. It should prove of great use to future workers and to visitors.

Two meetings of the Entomological Club were held at Oxford on June 30th and July 1st, 1928, Professor E. B. Poulton and Dr. Harry Eltringham being alternately in the chair. Members present in addition to the two chairmen:—Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis and Mr. Jas. E. Collin. Visitors present:—Comdr. J. J. Walker, Capt. N. D. Riley, Dr. S. A. Neave, Dr. F. A. Dixey, Prof. E. G. Waters, Dr. R. J. Tillyard, Dr. Guy A. K. Marshall, Messrs. W. H. T. Tams, E. Bolton King, E. B. Ford, A. W. Pickard-Cambridge, C. J. Wainwright. On Saturday the guests met at the Museum where tea was provided at 4 o'clock. All the collections in

the Hope Department were open to inspection. In the evening a meeting of the Club was held at Jesus College, Professor E. B. Poulton in the chair, dinner was served at 8 o'clock. On Sunday morning the Hope Collection were again on view and several of the party joined in an entomological excursion to Hell Coppice. After luncheon a boating picnic was organised on the River Cherwell and tea served on the banks of the river. In the evening a meeting of the Club was held at Wadham College, Dr. Harry Eltringham in the chair, dinner was served at 8 o'clock. The guests dispersed on Monday morning after a very successful meeting.

We would draw the attention of Dipterists to a most important monograph by Mr. Colbran J. Wainwright on "British Tachinidae" in the recently published *Transactions of the Entomological Society of London* (Pt. I. 1928; pp. 139-254: 2 plates). The author, who is well known as an expert on this family, is to be congratulated most heartily on this valuable contribution to British Dipterological literature. There is a useful preliminary chapter on the morphology and chaetotoxy of the head and thorax with diagrammatic figures and explanations, which are especially valuable, as the varying equivalent terms used by continental and other authors are also given. Then a full dichotomic key to the superfamilies and genera is followed by keys and brief descriptions of the species. The *Tachinidae*, although abundant and fair-sized insects, have long been a stumbling block to the average collector owing to the difficulty of correct identification. As Mr. Wainwright remarks, it is only of recent years that reliable differentiating characters have been found; and the older writers on this group were driven to lay too much stress on colour and other unreliable characters, with the result of much confusion and duplication of synonyms. This monograph should prove to be a great incentive to the study of the British *Tachinidae*, and enable collectors to add largely to our present inadequate knowledge of the distribution of the various species in the British Isles.—H.W.A.

On p. 62 ante there was a note on a black form of *Parnassius apollo* recently described as ab. *bergeri* by Anton Otto. In 1925 Leo Sheljinzhko of Kiev described a form which he states, *Zeit. Oestr. Ent. Ver.* XIII. 49, is almost completely identical with Otto's example, under the name ab. *satanas*, from Eastern Russia. This latter name is the prior.

In the *Zeit. Oestr. Ent. Ver.* for April, G. Warnecke discusses the problem "Is *Miana captiuncula*, a glacial relic?" In the May number K. Schawerda gives an account of a month spent in the high mountains of Corsica in 1927 adding the results of two previous visits. He describes a few new forms and species, and lists the micro-lepidoptera met with. In the June number there is figured and described a gynandromorph of *Angerona prunaria*, the R. side male, the normal orange form strongly marked with streaks, the L. side female, the normal ochre-yellow form with the sparse and very fine markings. The July number contains a very full and detailed illustrated account of *Cidaria otregiata*, *C. minna* and *C. suffumata*. There are 5 figs. of antennae and venation and a plate of 22 figures of forms of the three species.

The veteran Hungarian entomologist Dr. Horvath of Buda-Pesth has been made an officer of the Legion of Honour, on the occasion of the International Congress of Zoology which was held in 1927 in Buda-Pesth.

In recent numbers of *Lambillionea* the following new aberrations have been described. *Melitaea aurinia*, ab. *deficiens*, Cab., in which the hind wings had only the basal dark area, and a narrow marginal dark border leaving a large fulvous central area marked only by five small black antemarginal dots; the fore-wing markings were for the most part thin and less distinct; also ab. *transversa*, Cab., in which the fore-wings are crossed by a wide, black, median fascia. *Satyrus* (*Hipparechia*) *semele* ab. *fulcinea*, Cab., in which there is a large fulvous spot in the proximal half of the fore-wings. *Hippocrita jacobaeae* ab. *nigraea*, Cab., in which both the upper and undersides are blackish-brown, the normal red markings are little apparent above and still less below, the basal areas are faintly red gradually fading into the black-brown of the discal areas; also ab. *pallens*, Cab., of a greyish black with markings less bright, and hind-wings pale red.

The *Revue Russe d'Entomologie* has now reached its XX1st volume. It is noted that the present number 3-4 of 1927 contains the indexes for volumes XVIII (1922-4), XIX (1925), and XX (1926) which were long overdue. Much of the matter is in Russian but almost invariably there is a summary or précis of the articles in German, English or French. The Titles are always translated. Newly described species are noted in the indexes in clarendon type.

In the *Berichte der Section für Lep.* of the *Verh. Zool.-Bot. Gesell. Wien.*, vol. 78, pt. 1, Hans Reisse gives an account of his experiences with "light" in the Sierra Nevada in 1925 and 6, with comments on the species met with; Josef Nitsche describes his collecting experiences in the Plöcken and Karawanden areas of Carnolica in 1927; Egan Galvagni describes a new aberration of *Cabera pusaria* ab. *bilineata* in which the two middle transverse lines of the fore-wing and the central transverse line of the hindwings are missing. Fritz Priessecker contributes a long list of species, mostly micros, added to the records for Lower Austria; Hans Rebel comments on a number of species from Cyprus, contributed to the Museum, by our colleague Major P. P. Graves and describes several new species and forms, including a *Coleophora*, *C. cypricella*; and Schawerda describes *Erebia aethiops* ab. *paradoxa* in which both wings on both sides are devoid of eyes and the bands are rudimentary. Rebel's ab. *caeca* has ocelli on the hind wings.

The *Ann. Soc. ent. France* recently to hand contains an article by C. Dumont detailing his experiments on the results of a drastic alteration in the aliment of the larvae of various species of Lepidoptera. He substituted the carrot for the proper food of a large number of species and has recorded and classified the results in each case. The larvae were selected from those feeding on the chlorophyll bearing portions of plants and were placed where the only food was the xanthophyll of the root of the carrot. Some absolutely refused to touch the carrot, others died after digesting it, others appeared to develop normally but did not succeed in pupating, some again pupated but no emergence took place, some emerged producing normal speci-

mens, others were dwarfed, others physiologically albinistic, others melanic, some underwent a shortening of the pupal period, others were much delayed. Of most of the large number of species experimented with details of larval life under this condition are given.

The Cornell University at Ithaca, New York State, has issued a portly volume of some 1100 closely printed pages, *A List of the Insects of New York*, including Spiders and other allied groups. M. D. Leonard is the editor-in-chief and each of the 30 orders has been prepared by a specialist. The project was initiated some twelve years ago and Dr. Chester Bradley was appointed Editor and much of the early preparations were arranged by him, but subsequent pressure of other work caused him to retire in favour of the present editor in 1923. The names are not only listed, but all known localities are given for each species, with occasional remarks as to frequency and general habits. In all 16,124 species are listed, Coleoptera 4,546, Diptera 3,615, Lepidoptera 2,439, Hymenoptera 2,300, Hemiptera 1,591, etc. Each order has a short introduction and the generally recognised varieties are listed with their locality. Bibliographical references have been omitted for want of space. W. T. M. Forbes has given an account of the Faunal District of New York State, which for reference has been divided into numerous districts according to the topographical and geological characteristics of each. An index of genera, families and orders completes the work. The mechanical part of the volume is quite good and reference is easy. The names of the various compilers should ensure an approach to that absolute completeness and correctness which is so necessary in a work of this sort.

A meeting of the Entomological Club was held at Speldhurst Close, Sevenoaks, on July 21st, 1928, Mr. H. Willoughby-Ellis in the chair. Members and guests present in addition to the Chairman:—Messrs. Jas. E. Collin, W. J. Kaye, E. C. Bedwell, W. H. T. Tams, Hugh Main, H. E. Andrewes, K. G. Blair, F. Laing, J. C. Dacie, H. J. Turner, B. S. Williams, Rev. C. E. Tottenham. The guests were received at Speldhurst Close by Mr. and Mrs. Willoughby-Ellis and the afternoon was spent in the woods and gardens where tea was provided. The library and entomological and other collections were open for inspection, special interest was shown in the chairman's recently completed collection of British Hemiptera in which are incorporated collections of Douglas, Matthews, Blatch and others, nearly all the British species being well represented. Supper was served at 7.30 and many guests left at a late hour. Those who were able to remain spent the week-end at Speldhurst Close and on Sunday an entomological excursion was arranged in motor cars to the Thames Marshes near Gravesend. The meeting was very enjoyable although a considerable number of the Club and other invited guests were unavoidably absent due to the holiday season and other causes.

We would call attention to the forthcoming Annual Exhibition of the South London Entomological Society, which takes place on October 25th at the Society's Rooms, Hibernia Chambers, London Bridge, at 7 o'clock. Visitors are invited. Will intending exhibitors communicate at once with me at "Latemar," West Drive, Cheam.

REVIEWS AND NOTICES OF BOOKS.

THE BUTTERFLIES OF EASTBOURNE, by Robert Adkin, F.E.S., is a splendid little book. All those who know of Mr. Adkin's almost life-long connection with the S. London Entomological Society, will know the thorough, instructive, educative style of his frequent papers read at the meetings, and will not be disappointed. He has given, in the short space of some sixty pages, a sufficiently full and suggestive account of all the butterfly species found within a radius of a few miles of the town. The facts related are not a rehash of what one gets from the ordinary text-books, but are culled from the author's own intimate knowledge of the life-histories of the creatures, with notes of local interest so clearly put, that the so called "tyro" will find nothing above his powers, and the older student will find suggestions leading him to the higher biological problems incident to the study of natural history. Wherever opportunity offers remarks and subjects cognate to butterfly life are interpolated and we get migration, resting habits, protective resemblance, parasitism, hibernation, cannibalism, balance in nature, association with ants, etc., all illustratively introduced. Last but not least are no less than 15 plates with figures, not of imagines or larvae as such, but exquisite photographs of details of structure and life histories; for as the author says "There is far more interest to be gained in studying their habits and structure, than in merely catching them and hoarding them up in storeboxes."—HY.J.T.

NOVITATES MACROLEPIDOPTEROLOGICAE.—A catalogue of all the Palaearctic Lepidoptera described since the publication of the four volumes of Seitz. Vol. II. 1921-1926. and Vol. III. 1927. By Otto Bang-Haas.—These volumes of 326 and 120 pages respectively are a continuation of the valuable compilation begun in 1926 and which has proved so extremely useful to all who wish in any way to keep apace with the results of the study given to the lepidopterous fauna of the Palaearctic Region. The work is indispensable to all who are working or are interested in the variation of individual groups or species. With full references as to the author, original description, locality, etc., the species are arranged in accord with Seitz under their genus as therein contained. We are continually referring to it in our work on the British Noctuae. An improvement on Vol. I. is that the names of the species outstand the alignment of the names of the genera. There are pages of additional fauna lists consulted, and opportunity has been taken to add many names omitted in Vol. I. *e.g.* those of Tutt's *British Lepidoptera*. Verity's names are included, both races and subspecies; as also are Strand's names and Courvoisier's terms. There is an Index to Vols. I. and II. of 50 pages of the greatest convenience. The Publishers are Messrs. Staudinger and A. Bang-Haas, of Dresden-Blasewitz.—HY.J.T.

NOTE. p. 139, lines 9-11.—In the absence of the confirmatory evidence of the genitalia we hesitate in the acceptance of this as a separate species.—G.W., HY.J.T.

EXCHANGES.

Subscribers may have Lists of Duplicates and *Desiderata* inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

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Duplicates.—British *Lepidoptera*, many species.

Desiderata.—Back volumes of *Trans. Ent. Soc. Lond.*, and entomological magazines, bound or unbound.—Fredk. J. Killington, 177, Leigh Road, Eastleigh.

Wanted for cash or exchange many common forms of British *Jassidae*. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to *Jassidae*.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of *christyi*, *abruptaria* v. *brunnea*, black *consonaria* and *bidentata*, *ursaria*, *curzoni*, *jasionata*, *venosata* (Shetl.) and other melanic *Geometers* and *Noctuae*.

Duplicates.—Very many in first class condition, high-set only f. i. *Herminia flavicrinata*, *Andreas*, *Nych. dalmatina* race *andreasaria*, *Warnecke*, about 30 species of rare *Acidalias*; pupae of *Eupithecia illuminata* or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

Duplicates.—*P. apollo nevadensis* and rare Palearctic *Rhopalocera*, also African *Danaidae*, *Charaxes* and *Hypolimnas*.

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Duplicates.—Fine bred *prunaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.). *Tenthredinidae* and *Aculeates*.

Desiderata.—Species of *Dolerine* and *Nematine sawflies* not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Bred *Sparganii*, *Ochroleuca*, *Maritima*, *Straminea*, and many other *Noctuae*.

Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Mr. M. R. SMITH, A. and M. College, is anxious to know where he can obtain any of Emery's papers on North American ants; and also to know of any Europeans who would like to exchange separates and correspondence with him concerning ants.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean *Coleoptera*, especially *Carabus*, sps., for striking *Coleoptera* from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytocecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

Pairs of *Synanthedon flaviventris*, Stgr., bred Hampshire, 1928, in exchange for Entomological literature of any kind, especially foreign periodicals, proceedings and separate. Wm. Fassnidge, Hon. Librarian, Hants. Ento. Soc., 47, Tennyson Road, Southampton.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 17th. November 7th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Oct. 25th (Ann. Exhibition). Nov. 8th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

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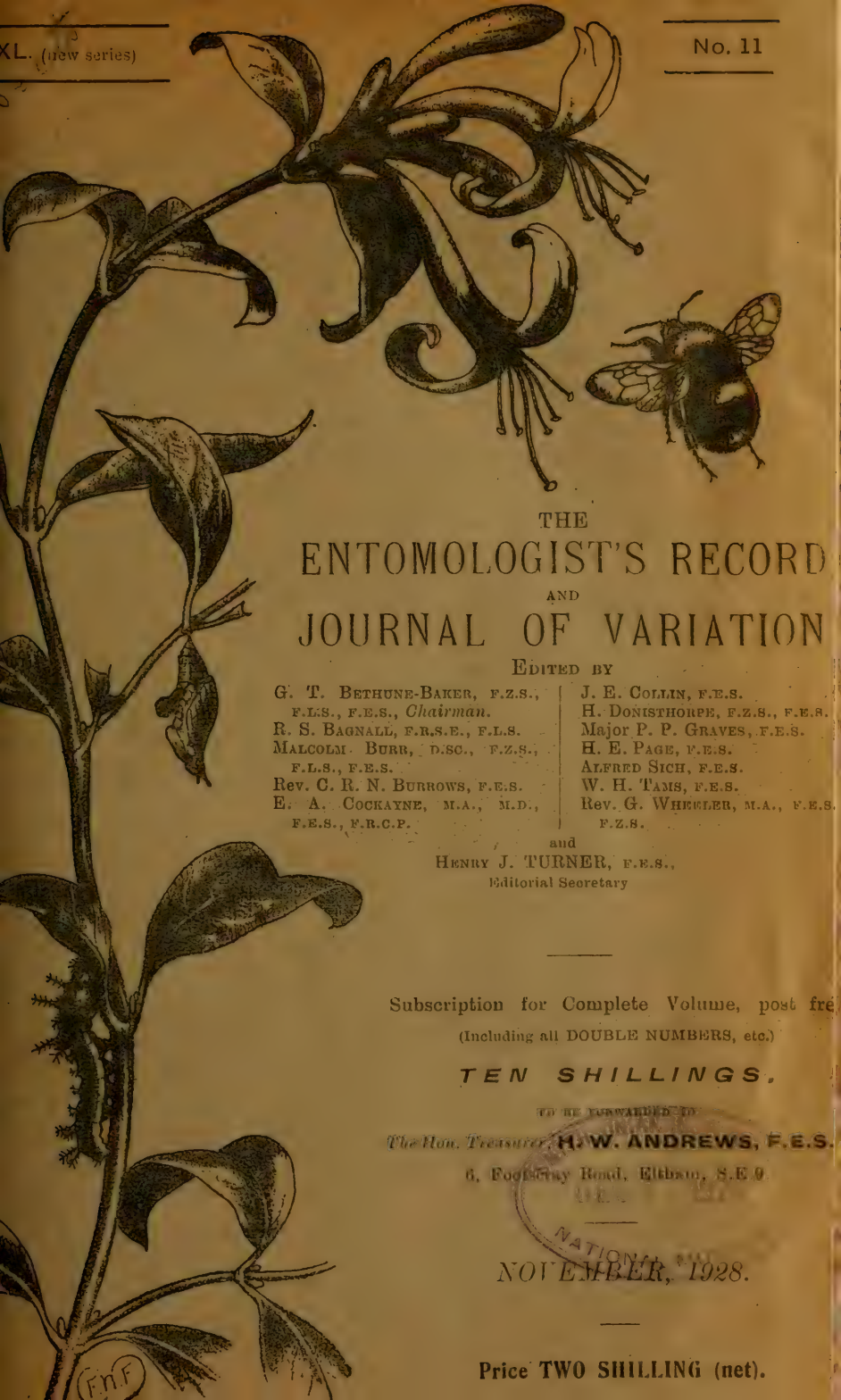
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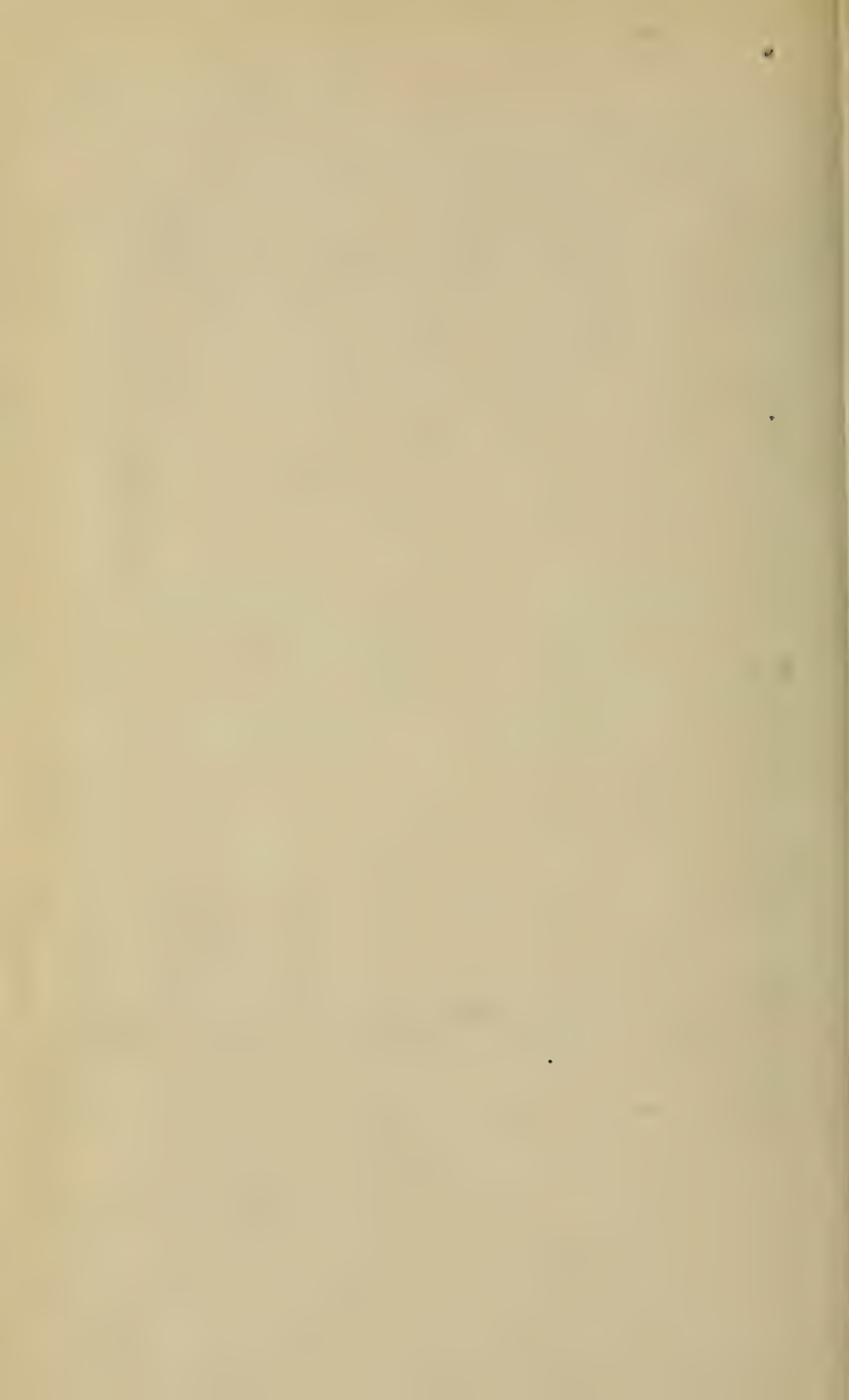
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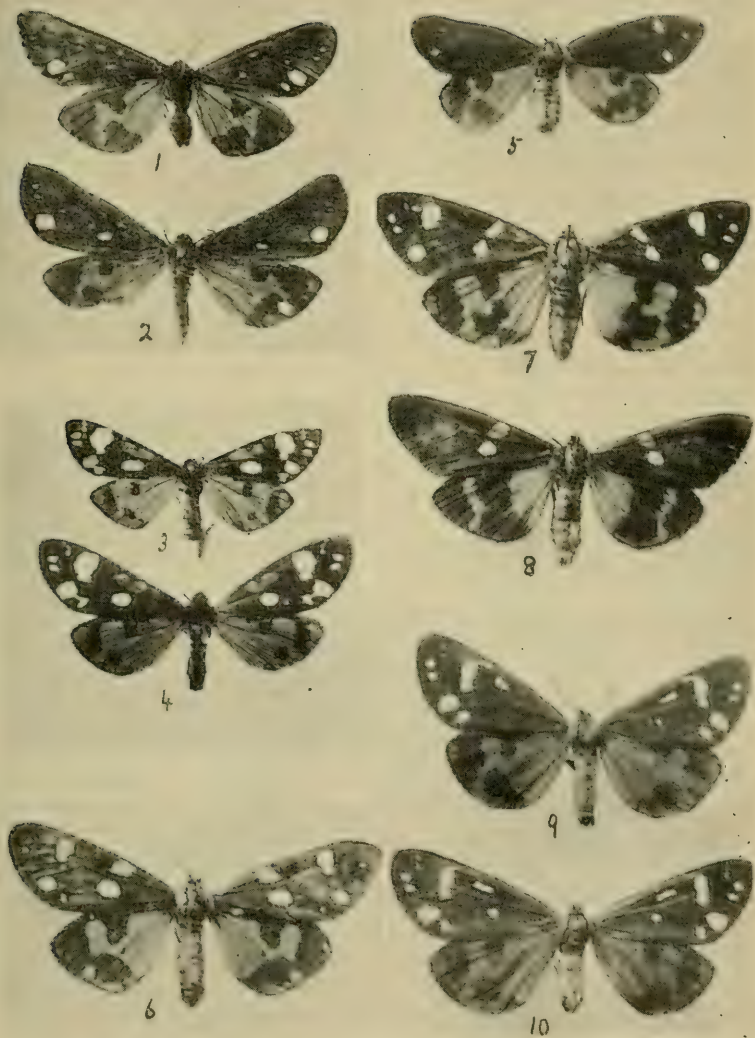


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Variation in *Callimorpha dominula*, L. (with 2 plates).

By E. A. COCKAYNE, D.M., F.R.C.P., F.E.S.

South, writing of this species, says, "Except in minor details this tropical-looking moth seems little given to variation in England," but since he wrote his book forms have been bred that necessitate some modification of his statement, and, making due allowance for its small range here, the amount of variation is considerable. We can claim as British ab. *hamelensis*, Pfluemer., ab. *lutescens*, Oberthr., ab. *spaneyi*, Strand, ab. *nigra*, Spuler, and perhaps ab. *persona*, Hb., in addition to the aberrations *bimacula*, *medionigra*, and *juncta* described below.

The form with the spots on the fore-wing all pure white is ab. *hamelensis* and a specimen is figured in Barrett's *Lep. Br. Is.*, Vol. II. Pl. 70. fig. 1c. The hind-wings are noticeably pale in colour. Possibly ab. *rossica*, Kol., with white spots on the fore-wing and hind-wings of a pale clear yellow is the corresponding recessive form. The form with deeper yellow hind-wings and with the basal spots of the fore-wings of the normal orange tint figured by Barrett from a wild specimen has been freely bred by Mr. L. W. Newman and is ab. *lutescens*, Obthr. This is commonly but incorrectly called *rossica*, a form that does not appear to have been taken in this country, though perhaps it, or a form resembling it superficially, would be obtained by interbreeding *lutescens* and *hamelensis*. Oberthür in his *Lépidoptérologie Comparée*, Vol. VI., figures both these forms with yellow hind-wings and clearly points out the differences. *Lutescens* is recessive to the type, and according to Mr. Newman fertile eggs cannot be got by pairing two homozygous recessives, so that to perpetuate the strain it is necessary to cross a homozygous yellow with a heterozygous red, or to obtain a pairing between two heterozygous red ones. Whether *lutescens* is genetically identical with *lusitanica*, the local form in North Portugal, is doubtful. As *lutescens* is infertile it could not form a race apart from the type, and it must be assumed that it is different.

In the Tring Museum there is a specimen with the red of the hind-wings and abdomen replaced by pure white. The scales are very thin and devoid of pigment as in *Heodes phlaeas* ab. *alba*, Tutt. If these forms prove to be hereditary, as I suspect they will, and not due to disease, this and the corresponding form of *Callimorpha quadripunctaria* will require names.

Specimens with all the spots on the fore-wings of a clear orange colour occur sporadically in England and on the Continent. There is a fine series of them in the Oberthür collection from Valais, where it must be a recurrent form. Barrett figures one with rather small spots from the Mason collection, and a number have been bred during the last two years by Mr. Newman from a small colony in the Oxford district. The result of crossing two of these orange-spotted ones in 1926 was interesting and unexpected, for out of a large brood only about ten per cent. were orange-spotted. It is clear that the form stands in no simple Mendelian relationship to the type. Vorbrodt considers that it is a temperature form and says it is not uncommon in the damp warm places in the Rhone Valley. Further evidence is afforded by the fact that one was bred by Standfuss from *dominula* × *persona*, a specimen with small orange spots on the fore-wings and with

hind-wings and abdomen like those of typical *dominula*. The larvae and pupae were kept at a temperature of 77° F. and passed very quickly through both stages. Newman's were kept under artificial conditions and it is not unlikely that a warm damp environment was responsible for their coloration; this explanation of their origin would also account for the ratio of orange-spotted to typical specimens not being a Mendelian one. Standinger described the race *bithynica* from Asia Minor as having all the spots on the fore-wings yellow or brownish. Seitz whose figure is unsatisfactory says that *bithynica* has more black on the hind-wings and abdomen than the type, and according to Mann the larva has darker yellow spots than that of typical *dominula*. In view of these facts it is almost certain that the orange-spotted European form is not identical with the Asiatic despite the use of the name *bithynica* for both of them by South and Oberthür. Strand named the form ab. *spaneyi* and said it was portrayed by Standfuss (*Palaarkt. Gross Schmett.* Taf. VI. fig. 16), but it is doubtful if his name is not synonymous with ab. *ochromaculata*. Fuchs. Fuchs gave this name to a form taken near Elberfeld and says that all the spots on the fore-wing are yellow ochre (ockergelben). Even if the two forms do differ slightly in colour they seem to be too much alike to deserve separate names.

The form in which all the light markings on both the fore and hindwings are replaced by black, ab. *nigra*, Spuler, is a very rare aberration and the few known examples are from Kent. It resembles the black forms of *Zygæna* and may, like them, be recessive to the type. The British Museum is fortunate in possessing three specimens in addition to the one in the Doubleday collection, which was figured in Millière's *Iconographie*, Vol. III., and named by Thierry-Mieg ab. *nigrorividis* (*Ann. Soc. ent. Belge*, 1910, LIV., 386), a name that falls before Spuler's given in 1906.

There is another abnormality in marking which seems to be recurrent and sufficiently distinct to be worthy of a name. Ab. **juncta**, nov. ab. The proximal and distal spots in the discoidal cell of the forewing are confluent and form a mark in shape like a dumb-bell. Two are figured, the smaller labelled 'Howard Vaughan Coll. Angleterre' (fig. 3), and the larger '2245, Ingerheim' (fig. 4). Both are in the Oberthür collection.

In this paper I do not propose to discuss all the variations in the arrangement of the spots in this species, but wish to direct attention more particularly to the different ways in which the dark ground colour may be extended over the fore and hindwings.

Some years ago Mr. Newman saw a very fine aberration, which had been caught wild by a gamekeeper in the neighbourhood of Oxford. In the following spring he collected a number of larvae along the ditch-side to which it is confined, and bred, so far as he can remember, only typical specimens, but from a pairing between two of them some abnormal ones were bred the year after. Two of these abnormal ones paired and in the brood so obtained there was a large number of the same abnormal form and a much smaller number of typical ones and aberrations like the one captured by the keeper. This beautiful and distinct form does not appear to have been met with elsewhere, and I give the following description of it.

ab. **bimacula**, ab. nov. The forewings are glossy green with all

the spots obliterated by black scales with the exception of the two basal spots, which are, as in most members of this colony, rather small and not confluent. In a few specimens some of the other spots are not entirely obliterated and are represented by tiny dots. The hindwings are very heavily marked with black. The most extreme examples have the whole apex black, and the black spots nearer to the base united into a broad black band running right across the wing, and in some cases this black band is united by a narrow black stripe near nervure 3 to the black apical area. There is a good deal of minor variation in the exact extent and distribution of the black markings on the hindwing, and in both fore- and hindwings there is often slight asymmetry. (Pl. VI., fig. 3 and pl. VII., fig. 8.)

The following is a description of the abnormally spotted specimens that gave rise to ab. *bimacula* and were bred with it.

ab. **medionigra**. In the forewing the orange spot, that lies just internal to the disc and forms the central spot of the wing, is absent or very small; the apical spots are reduced in size and sometimes in number; the large sub-apical blotch is reduced to one fairly large spot and a second very small one posterior to it; the double spot near the inner angle is reduced to a single spot with, in some cases, a dot representing its posterior component. In the hindwing the black markings at the apex are increased in extent and there is an extra black spot lying across nervure 2 between the discal spot and the black spot or spots near the anal angle, all of which are larger than in normal specimens from this colony. The extra black spot may be quite small or so large as to unite with the black markings anterior and posterior to it. (Pl. VI., fig. 2, and Pl. VII., fig. 7.)

There can be little doubt that ab. *bimacula* is the homozygous recessive and that *medionigra* is heterozygous for *bimacula* and the type. If so one of the parents of the brood that produced the first abnormally spotted ones must have been itself abnormal, and either the abnormality was completely overlooked or was so slight that the specimen was mistaken for a typical one. The latter seems to be the more probable explanation. I have bred two *dominula* from a neighbouring locality, one with two tiny specks of black surrounded by a yellow ring and the other with a distinct but small black spot where the extra spot is situated in the hindwing of *medionigra*, but in both cases the central and other spots of the forewing were present though reduced in size. I cannot help thinking that these were heterozygotes, in which the dominance of type over recessive was greater than usual, but I must admit that most of Mr. Newman's heterozygotes were far more clearly differentiated from the types.

The propriety of naming a heterozygote may be questioned, but there are precedents. It has been done unwittingly many times, and in *dominula* itself it has been done deliberately by Standfuss. The heterozygote must be much commoner in nature than the pure recessive, and, if it is a named form, is much more likely to be recognized in other localities both at home and abroad than if it is left nameless. I have looked through the series in the British Museum and have found several with the characteristic features, loss of the central spot and the posterior spot at the inner angle with reduction in size of the other spots on the fore-wing correlated with the presence of a small extra spot in the hind-wing, though these features are not so well

marked as in the Oxford specimens. They are from Digne, Valais, and Fusio in Switzerland, and one from the last named locality is figured by Oberthür (*Lépidoptér. Comp.* 1912. VI. Pl. cxviii. 1040).

In Italy there are two races, in which the increase in the dark areas in both wings has a different distribution from that found in the aberrations mentioned above. In Liguria the race *italica*, Standfuss, occurs and in Tuscany the race *persona*, Hb., is found mixed with a small percentage of *italica*. In the Oberthür collection there are some specimens with an extra spot on the hind-wing in the same position as that occupied by the extra spot in *medionigra*, and in some of them the central spot of the fore-wing is absent. One of these is figured in *Lépidoptér. Comp.* 1912. VI. pl. cxvii. 1030, and my plate VII., fig 6, shows a second one. Though there are slight differences in the disposition of the other dark markings the resemblance to the heterozygous specimens from Oxford would be very close indeed, were it not for the yellow colour of the hind-wings. Standfuss crossed a male *persona* with a female *dominula* and obtained specimens intermediate in their markings all of which had red hind-wings, a result to be expected if the yellow of *persona* behaves like the yellow of *lutescens* as a recessive; in the reverse cross rather less than half the brood had red and rather more than half had yellow hind-wings, a result which can only be explained, if yellow is recessive, by supposing that his *dominula* was heterozygous for yellow. He named these specimens, heterozygous for the factor or factors for dark markings, *ab. romanori*, and a form identical with, or closely resembling it, is said by Oberthür to occur in a wild state near Turin. There are various gradations linking up the lightest *italica* with the darkest *persona*, and in all probability there is more than one factor for dark markings, so that specimens of *romanori* must sometimes show markings like the *italica* I have figured, though no such specimen is to be found in the Oberthür collection nor is one shown on the plate in Standfuss' *Handbuch*. The point is not without interest, because it demonstrates that insects as distinct genetically as *romanori* and *medionigra* may be almost, if not quite, indistinguishable in external appearance. Beyond drawing attention to this one feature of the more lightly marked *italica* and *persona* I do not wish to discuss them further. The distribution of the dark markings is beautifully portrayed by Oberthür in his *Lépidoptérologie Comparée* vol. VI. and by Standfuss in his *Handbuch*. Specimens of *persona* reputed to have been taken in Kent were to be found in the Maddison and other old collections, but I do not know of any recent captures of this form in England and strongly suspect that they were of foreign origin.

Though these Italian races have been dealt with so fully, other forms, which show an extension of the dark markings, and which appear to be recurrent, have attracted little notice. In one of these the extension occurs chiefly on the basal half of the fore-wing.

ab. basinigra, nov. ab. In the forewing the basal spot near the costa is absent, and the second basal spot is either absent or reduced in size; the central spot is small and unusually long and narrow; the diameter of the sub-apical blotch is reduced in the long axis of the wing, and from its anterior end a long thin hook-like process runs towards the base almost parallel with the costa, or there is a white dot in the situation occupied by the extremity of this process; the apical

spots are very small, and the two spots near the termen are reduced in size; the two spots at the inner angle are separate but of average size; the black markings in the hindwing are well developed with the two spots near the anal angle united.

Two specimens are represented on the plate VII. (figs. 9 and 10), the first of which has no basal spots on the left side and only a very small one on the right. There are three specimens from the neighbourhood of Paris in the Oberthür collection from the Bellier collection, one of which is figured (*Lépidoptér. Comp.*, 1912, VI., pl. cxviii., 1039), and may be taken as the type. The size and shape of the spots in this form give it a very distinct facies.

Another very interesting aberration is figured in Ernst and Engramelle's *Papillons de l'Europe*, pl. cliii., fig. 197b. The two basal spots are small and narrow, and the central spot is reduced to a mere dot, but the other markings on the forewing are almost normal in size, though those at the inner angles are oblong. There is a considerable extension of black on the hindwing, but no tendency towards the formation of a transverse band. The red on the abdomen is reduced to two lines of dots, one in each sub-dorsal region. The specimen came from Francfort-sur-le-Mein, and its appearance suggests that it may be a mutation rather than a chance aberration.

I give a figure of another aberration from the Oxford locality bred by Mr. Newman in 1927 (pt. VII., fig 5). The left fore-wing is a little crippled and has only one small white spot, the anterior of the two at the inner angle. On the right fore-wing there are three small white spots, the sub-apical, the anterior of the two at the inner angle, and the anterior of the two at the termen. The discal spot on the hindwing is large, but there is no increase in the black on the hindwings at all commensurate with that on the forewings.

Ab. marita, Schultz, with the fore-wing entirely glossy black and with the hind-wing sometimes suffused with black was produced by treating the pupae with ice, and *ab. paucimacula*, Schultz., with some spots absent and the others reduced in size was also produced in the same way. In the most extreme examples of *paucimacula* the only remaining spot is the one at the inner angle. Seitz does not mention that these are artificial forms, but Spuler, who says he has some in his cabinet, figures one with other insects produced by temperature experiments (*Schmett. Europ.* Taf. 14. fig. 21) and Krodol figures several in the *Internat. Ent. Zeitschr.* 1905, vol xix. The Oxford specimen was the only abnormal member of the brood and its appearance is sufficiently like *paucimacula* to make one wonder whether it was produced by some external influence exerted during development, though frost cannot have been the cause, rather than by some abnormality of the germ plasm.

In the British Museum there are two specimens, which in the absence of any account of their origin must be assigned to *paucimacula*. Both agree in having a great extension of black on the anterior part of the forewings and some increase in the black markings of the same part of the hindwings. One is in the Oberthür collection labelled 'ex coll. Reynald' and the other labelled Lauban is in the general collection. I give figures of these insects, interesting, if they were not produced artificially, on plate VII., figs. 1 and 2. The white mark

on the hindwing of the Lauban specimen is due to a hole. There is also a British example in the Tring Museum.

From the foregoing remarks it will be seen that there is correlation between the amount of black on the forewing and that on the hindwing, though the increase may be greater in the one than in the other. Only in exceptional cases, as in *neca*, is the increase confined to one pair of wings. It will be seen also that, when there is an increase in the black in both wings, the situation which it occupies is generally the same. In *persona*, though the whole of both wings is darkened, there is a tendency for the black coloration to be most intense in the central part of the forewings, and in the hindwings for it to spread along the nervures from spots in the centre of the wing on nervures 3 and 1 as well as from the margin. In *medionigra* it is increased chiefly in the centre of the wings, in *bimacula* in the central and distal parts, and in *basinigra* in the proximal half of the wings. In the most extreme forms produced by the action of cold all the light markings of the forewings may be obliterated, but the greatest amount of darkening in the hindwings of these specimens takes place in the anterior part, while in the less extreme there is a greater degree of darkening in the anterior than in the posterior part of both pairs of wings.

Ab. hamelensis, Pflüemer. (*ab. albibimacula*, Favre.) *Stett. Ent. Zeitz.* 1879, XL. 158. Spots on fore-wing all white. Recorded from Germany, France, and England.

Ab. rossica, Kolenati. *Mel. Ent.* 1846. 95. Spots on fore-wing all white; hind-wings saffron yellow. Oberthür says "stripe on abdomen broader and size larger. Russia."

(*Ab. lutea*, Stdgr.), *Staudinger's Catalogue*, Ed. I., 1861, 24. "Al. post. et abdomine luteis." Staudinger treats this as a synonym of *rossica* in later editions.

Ab. lutescens, Obth., *Lép. Comp.*, 1911, Vol. V., part 1, 18. Spots on fore-wing as in type, three basal ones orange; hind-wing orange-yellow; dorsal stripe of abdomen narrow.

Ab. lusitanica, Stdgr., *Iris*, 1894, VII. 256. Fore-wings as in type; hind-wings yellow. Local race in North Portugal.

Ab. intermedia, Rocci. *Atti Soc. Ligust.*, 1914, XXV. 190. Hind-wings and abdomen orange; black markings as in type. Intermediate between type and *rossica* (presumably *lutescens* is meant), both of which fly with it in Piedmont.

Ab. insubrica, Wackz., *Stett. Ent. Zeitz.*, 1890, LI. 216. Fore-wings with smaller spots; hind-wings tinged with yellow (obscure luteis).

Ab. bithynica, Stdgr., *Staud. Cat.*, Ed. II., 1871, 56. Spots on fore-wing all yellow or brownish (chamois leather colour: Oberthür); abdomen with broad dorsal stripe; (more black on hind-wing. Seitz). Local race in Asia Minor.

Ab. ochromaculata, Fuchs., *Jahrb. d. Nassauischen Vereins f. Naturkunde*, 1900, LIII. 41. Spots on the forewing all yellow ochre (ockergelben).

Ab. spaneyi, Strand., *Ent. Rundschau.*, 1912, XXIX. 64. Spots on the forewing orange-yellow and mostly larger; hindwings with typical colour and markings. (Pl. VI., fig. 1.)

Ab. bieli, Stdgr., *Iris.*, 1894, VIII. 256. Spots on forewing all

orange-yellow; hindwing reddish-yellow (gelb-roth). Local race in Portugal.

Unnamed. Red of hindwing and abdomen replaced by pure white.

Ab. domina, Hb., *Europ. Schmett.*, no. 223. Staudinger says 'al. post nigris, basi maculis luteis, abdomine nigro' and sinks it as a synonym of *persona*. Reference to two copies of Hübner shows in both an insect with central spot of forewing absent and the others small, but with the black markings of the hindwing not much increased and clearly visible on a ground colour of a deep brown except for two small yellow patches. Oberthür quite correctly differentiates it from *persona* and compares the figure with that of Godart (*Nocturnes de l'Hist. Nat. des Lépidopt. ou Papillons de France*. Par. 1822), who depicts a *dominula* typical except that the red of the hindwings is replaced by brown, the usual black markings being clearly shown.

Ab. nigra, Spuler, *Schmett. Europe.*, 1910, Vol. II. 140. All light markings on fore and hindwings black.

(*ab. nigroviridis*, Thierry-Mieg.). Synonym of *nigra*.

Ab. conferta, Schultz. *Soc. Ent.*, 1904-5, XIX., 148. Forewing: all spots confluent.

Ab. fasciata, Spuler, *Schmett. Europ.*, 1910, Vol. II. 140. Spots on forewing confluent in pairs transversely.

Ab. juncta. Proximal and distal spots in discoidal cell of forewing united. (Pl. VIII., figs. 3, 4.)

Ab. radiata, Krodell, *Internat. Ent. Zeitschr.*, 1905, XIX. Two large white streaks at base of forewing on under-side.

Ab. italica, Standfuss., *Iris*, 1885, I. 26. Forewing: spots larger; hindwing very dark yellow, even reddish; (abdomen black with yellow lateral dots: Oberthür). Local race in Liguria, sporadic in Tuscany.

Ab. donna, Costa, *Ann. Soc. Ent. France*, 1842, XI. 239, Pl. 9. Forewing of *dominula*; broad black border to hindwing with one yellow spot in it; abdomen black or with yellow lateral dots. Similar to if not synonymous with *italica*.

Ab. persona, Hb., *Beiträge*, 1790, II. 4. Forewing: spots small; hindwing with yellow basal streaks and great extension of black. *Italica*, *persona* and intermediates form a local race in Tuscany.

(*ab. donna*, Esp.), *Abbild.*, 1794, IV., Pl. 150, fig. 1. Synonym of *persona*.

Ab. postochrea, Stauder, *Soc. Ent.*, 1925, XL. 7. *Domina* with the small pale spot of hindwing red ochre not yellow. I do not feel sure whether this is a form with brown hindwings and a small red ochre patch instead of the two yellow ones shown by Hübner, or a *persona*.

Ab. romanoti, Standfuss. Hindwing black increased, only base being red. *Dominula* ♂ × *persona* ♀. A form indistinguishable from these heterozygotes flies wild near Turin.

Ab. medionigra. Forewing spots reduced in size and almost always fewer, central spot seldom present; hindwing with black increased and extra black spot.

Ab. bimacula. Forewing with only two basal spots or with mere traces of others; hindwing: black at apex increased and broad black band across wing.

Ab. basinigra. Forewing with basal spots absent or represented by one small dot; central spot elongated; subapical spot hollowed out on basal side; others reduced in size.

Ab. nera, Schultz, *Soc. Ent.*, 1904-5, XIX. 148. Forewing normal; hindwing: costal spot fused with those at inner angle and apex forming transverse band.

Ab. pompalis, Nitsche, *Verh. zool.-bot. Wien*, 1924-5, LXXIV-V. (65). Hindwing very deep red; marginal spots united to form band; very broad costal spot; abdominal stripe very broad.

Ab. paucimacula, Schultz, *Soc. Ent.*, 1900, XV. 17. Forewing spots reduced in number, those absent being the two at apex, the lower of the two at inner angle, and the central; others small; hindwing normal. Elsewhere Schultz says spots reduced, often absent with one exception, black on abdomen and hindwing increased. This agrees with Krodell's plate (*Internat. Ent. Zeitschr.*, 1905, XIX.).

Ab. marita, Schultz, *Nyt. Mag. Nat. Krist.*, 1905, XLIII. 11. Forewing completely glossy green; no spots; hindwing sometimes dusted with black.

PLATE VI.

LEGEND.

fig. 1. *ab. spaneyi*. Oxford. Shows normal extent of light markings in this colony.

fig. 2. *ab. medionigra*, average specimen.

fig. 3. *ab. bimacula*.

PLATE VII.

figs. 1 and 2. *ab. paucimacula*. British Museum.

fig. 3. *ab. juncta*. England.

fig. 4. *ab. juncta*. Continental.

fig. 5. Oxford specimen near *paucimacula*.

fig. 6. race. *italica* to compare with heterozygote on plate I.

fig. 7. *ab. medionigra*. Heavily marked.

fig. 8. *ab. bimacula*.

figs. 9 and 10. *ab. basinigra*.

Zygaenae, Grypocera and Rhopalocera of the Cottian Alps compared with other races.

By ROGER VERITY, M.D.

(Continued from page 144.)

Melitaea phoebe race *sytleion*, Frbst.—Oulx (males from July 4th; females emerge from July 6th till August 9th); Cesana; Clavières. This species contrasts with the preceding by its considerable local variability. The average features of the numerous races are, however, not easy to grasp and to designate, because individual variation is remarkably broad in most localities. Large series of specimens are, on this account, usually required. Most of the European races have been described and named singly, but, to my knowledge, no attempt has been made to group them and contrast them clearly, so that to study those of the Alps it will be necessary to begin by a general survey. The first remark to make is the rather surprising one that all writers have mistaken the author of the specific name. It is persistently attributed to Knoch, whereas it was erected in 1775 by Schiffermüller; if the latter's were to be considered a "nomen nudum,"

the name of *trivia* and others, which are universally accepted, should be discarded too, because they are in exactly the same position. Besides, if this were done, the names of *corythallia*, Esper, or that of *paedotrophos*, Bergstr., both erected in 1780, would become specific before Knoch's *phoebe* of 1783. As things stand, the Vienna race, which inhabits Austria and Germany, is the nymotypical one. It is characterised by its rich, warm tone of fulvous, usually uniform on all the wings or slightly whitish in the premarginal spaces, and by its very large, thick black markings, on both surfaces. This race is well figured by Esper, pl. 61, f. 6, from Germany; *paedotrophos*, Bergstr., from Hanau, also belongs to it and the figure by Seitz and other modern authors represent this German race too. The one of South Tyrol, called *koios* by Frühstorfer, only differs from it in that the two premarginal bands are thinner and the fulvous space between them is broader, whilst the black basal suffusion is less; my specimens are from the Mendola, at 1300m., as well as from the Isarco Valley; those I have collected at Vanzone, 750m., in the Anzasca Valley, under Mt. Rosa, seem, more or less, similar to them, and I would say the same of the Bormio ones, on the Stelvio road. Frühstorfer states *koios* is the race of Carniola, so that it spreads to all the Eastern Alps.

My long series, collected near Intra, on Lake Maggiore, from April 28th to May 4th, is distinctly different and evidently belongs to race *roria*, Frhst., described from Maroggia, under Mt. Generoso, in Tessin; size smaller and in 25% of the males as small as in the summer generation *emipauper*, Vrtý.; forewings narrower and sharper; tone of fulvous very uniform and the brightest I have seen in the species; black pattern constantly and evenly reduced on all the wings. Its small II. gen. has been called *autumnalis*, Frhst., although he states it flies in August! By the general reduction of the black pattern *roria* is evidently the beginning of an approach to race *tusca*, Vrtý., which inhabits nearly the whole of Italy, with very little local variation, and which belongs to the second Group of races of *phoebe*, stretching eastward to Bulgaria and Greece as race *egyptia*, Frhst., and to Southern Russia and further east as *aetherea*, Ev. Its features are the uniform, clear and rather dull tone of the fulvous and the reduction of the black markings, as compared with the nymotypical Group. In race *tusca* of Italy these features are more particularly accentuated than in *aetherea*; its II. gen. I have described in the October, 1919, *Ent. Rec.*, as *pauper* and *emipauper* (= *rostagnoi*, Trti., 1920), the former being the smallest known form of the species and the latter being intermediate in the less arid localities. Esper, on plate 72, fig. 2, gives a figure of *tusca*, which is excellent in his original edition (not in Charpentier's rough, later, reproduction of it). On the Carso, above Trieste, and at Portorose, in Istria, the two generations are quite *tusca* and *emipauper*, except that a few individuals point to nymotypical *phoebe* by their more complete black pattern; these resemble race *phorbina*, Trti., of the Aspromonte in Calabria, probably owing to the damp sea-air. In this second Group of races one must include also a race of the Alpine region, very different from all the others by the tone of fulvous, as well as by the great reduction of the black pattern, which give it a strong resemblance to *tusca*; it has however a striking peculiarity in most individuals, consisting in the large size of the black dots crossing the middle of the wing; the partial effacement of the premarginal streaks

make them stand out still more on the broad fulvous areas. I have named (*i.e.*) this race **monilata** from specimens of Martigny in the Valais; others are from the Forêt de Finge. At high altitudes one finds in the Valais a totally different race, in which the fulvous is replaced by alternate deep red and yellowish white areas: *alternans*, Seitz, described from Zermatt. This character is coupled with very large size, broad, thick black bands and a great deal of black suffusion at the base of the wings in my race *nigroalternans* from Bard, on the Mt. Cenis road, and Falcinagna, above Bussoleno. Race *minoa*, Frbst., of the Engadin, is another very melanic high alpine one, but not as large and without the *alternans* feature. We next come to race *syllion*, Frbst., of the Cogne Valley, to which belongs the one I have collected at Oulx, although here individual variation is extraordinary and no doubt greater than at Cogne. The average characteristic *syllion* has a rather even, rich fulvous and a uniformly well developed black pattern, so that it falls in the First Group and, as a matter of fact, it only differs from nymotypical *phoebe* by its brighter fulvous and by the thinner and more even network of black streaks, not broadening as much in large spots. Two of my nine females are, however, *nigroalternans* and, out of sixteen males, one belongs to this form, two are quite small and just like *empuiper*, whilst two others are a near approach to race *virgilia*, Frbst., of the Maritime Alps. The latter is interesting, because, as rightly pointed out by its author, it is a transition between the other Alpine races and the Iberic ones, by its thin, regular black pattern and distinctly alternate broad fulvous areas of a richer and of a paler tone. To be more exact, I might say that it is a transition from *syllion*, with which the race of Gèdre, in the Hautes Pyrénées, is perfectly identical, to the race generally distributed in the whole of France and obviously transitional to the Third Group, inhabiting the Iberic Peninsula. Oberthür has stated that some French specimens, even as far north as Paris, are quite similar to the *occitanica*, Stdgr., of Catalonia; to be perfectly correct one must note, however, that the underside is not as white, its black streaks are not as thin and its general aspect is not as pale as it always is in Spain, whilst on the upperside the average extent of the black pattern is decidedly greater, when series of specimens of the two regions are compared. I propose naming the I. generation of France **suboccitanica** and the II. gen. **subcorythallia**, taking as "co-types" my series from Auzay (Vendée) of May and of August. There exists, however, in France an extreme, opposite form, which never occurs in Spain, parallel to *phoebeina* of the Italian *tusca*, by the thickness of all the black pattern; as a rule the fulvous is in that case dull and pale and even whitish in the female, except the reduced space between the two premarginal bands, which is of a deep red colour, especially in the male. I name it **crassenigra**, from my examples of the Gironde (Villeneuve and Pessac, of August), of the Lozère (Le Rozier at 600m., of July 10th) and of Ambollos in the Pyrénées Orientales. Lhomme in his *Cat. Lép. Français*, p. 58, states that on the Aigoual Mt. (Cévennes) there is in August, at 1500m., a form in which the basal half of the wings is heavily loaded with deep black and Frühstorfer, in the *Soc. Ent.*, 33, p. 42, describes a small race from the Mt. Doré, in Auvergne, which has the hinder part of the forewing and the entire hindwing covered by a greenish suffusion: **galliaemontium**.

As to the Third Group of races, proper to the Iberic Peninsula, the chief remark which must be made is that Esper gives in his original, 1780 edition, pl. 61, fig. 5 and 6, two excellent and unmistakable figures of both sexes of the second generation from some locality of that region, erecting for them the name of *corythallia*. It seems incredible that this fact should have been hitherto entirely overlooked and that the name should have been taken up, as spelt (with one *l*) and used by Hübner ten years later, for an aberration of *M. athalia*. This homonym must be replaced by *eos*, Haworth, of 1803 = *pyrronia*, Hb., of 1804, and *corythallia* must be used according to the meaning first given to it. My series of specimens collected near Barcelona in the second half of July and another from 800 to 1000m. in the Serra da Estrela (Portugal), from July 19th to Sept. 21st, resemble each other exactly and both contain individuals like Esper's figures, so that I fear the name of *francescoi* given by Sagarra to the second generation of Barcelona must fall before *corythallia*. Prof. Sagarra has not been fortunate with this species, because his name of *bethune-bakeri* for the race of the Sierra Nevada must fall too, as it is identical with that of Castile named *querara* by Frühstorfer. The latter's race *gerinia* from Lisbon seems distinct enough and *occitanica*, Stdgr., should be used for the first generation, of April, of Barcelona, whence is the "type" labelled by him and preserved in the Bang-Haas collection; it is very different from race *querara*, to which all writers apply the name, and its exact position is between it and *suboccitanica*, described above.

It seems to me the three Groups of races I have made out are actual exerges, corresponding to those of many other species: Exerge *phoebe*, Schiff., is the most ancient in Asia, but it is the last that arrived in Europe, by the Siberio-Russian northern route in the same way as nymotypical *M. aurinia*; exerge *aetherea*, Ev., corresponds to exerge *provincialis*, B., of *aurinia*; exerge *corythallia* has originated from the second along the Africo-Iberic route, like *beckeri*, Led., did from *provincialis*; finally, the parallelism is completed by the distinct satellite species *aetherie*, Hb., corresponding to *M. desfontainii*, God. What has made the exerges of *phoebe* less striking is that it could spread more in the dry lowlands, so that its exerges have wandered further and mixed more, producing several intermediate races, as we have seen, in the Alps and in France. Extreme drought, however, has produced a particular race of very small size in Palaearctic Africa (*punica*, Obth.) and a transitional one in Sicily (*emipunica*, Vrtý., 1919 = *punicata*, Ragusa, Aug. 1920), which seem to constitute a fourth exerge, with a different constitution, because they exhibit a different line of variation from the II. generations of *aetherea* and *tusca*, also produced by heat and drought.

Melitaea didyma race *subalpina*, Vrtý.: Oulx (males from July 7th to 31st, females from 25th to Aug. 10th), Cesana, and race **parvalpina**, mihi: Clavières (both sexes worn and fresh on July 29th).—The remarks on the position and the variations of these races are in a paper on this species, which is to follow shortly, but I can mention here that the chief characteristic of the second is its minute size as compared with the other races of the Alps.

(To be continued.)

Nomenclature.

The British National Committee on Entomological Nomenclature owes its origin to the International Congress of Entomology held at Oxford in 1912, and one of the assigned duties is to consider the elucidation, extension and emendation required to the International Code.

This committee in 1924, under the Chairmanship of Mr. G. T. Bethune-Baker, began the revision in real earnest, and at the Congress at Zurich in 1925 presented a Report which contained certain emendations and suggestions. The International Congress accepted the Report, so far as it went, as a basis for further deliberation. Since then the British Committee has diligently and steadily worked at the Revision, until in the summer of the present year and in anticipation of the Fourth Entomological Congress at Ithaca, New York, U.S.A., in August, there was published in the Proceedings of the Entomological Society of London, a Report containing a complete Revised Rules of Entomological Nomenclature.*

Two articles only were referred back and a slight alteration was made in another.

Article 4: a slight alteration of wording was carried "nem. con."; Article 5: was referred back with an approval of the general principle involved, no one dissenting; Article 14: which reads, "The term used as a 'name' for any concept lower than subspecies has no status in respect of priority, the accepted meaning of a subspecies being a geographical, or (in the case of parasites) host variation," with its "Recommendations,"† was referred back for further consideration and report.

The Congress then agreed nem. con.: "That the balance of the Report be referred without prejudice to the International Commission on Zoological Nomenclature for consideration after the said Report has been approved by the International Committee on Entomological Nomenclature."

It is confidently expected that the Revised Code of Rules contained in the British National Committee's Report, backed as it is by the unanimous vote of the International Congress, will be approved when presented to the International Committee on Entomological Nomenclature, and, I hope, will finally receive formal acceptance from the International Commission on Zoological Nomenclature.

When this final approval is obtained we hope, that now that entomologists as a body have zealously taken in hand the "setting of their own house in order," the revised and simplified rules will be accepted without reserve, and those of us who have obstinately refused to be dictated to by an "outside" body, and have taken a more or less independent line, must take it as a duty to conform to the new rules and accept the new discipline from within.

NOTES.—1. It was carried unanimously: That the members of the International Committee on Entomological Nomenclature be elected for a period of three Congresses and that at every Congress one third of

* Copies of this Report can be obtained from the office of the Entomological Society of London, 41, Queen's Gate, S. Kensington, S.W.7, by forwarding postage 1d.

† The "Recommendations" are in the nature of advice and have not the force of laws.

the members retire according to seniority, but that such members be eligible for re-election, provided that they have attended at least one Congress within the term of their office.

2. The Congress carried nem. con: That the International Committee* on Entomological Nomenclature be endowed with judiciary power to decide cases in Nomenclature.—HY. J. TURNER.

* The members of this Committee are not all chosen as yet.

NOTES ON COLLECTING, etc.

SYNANTHEDON FLAVIVENTRIS, STGR., AB. *FULVA*, NOV. AB.—Among the specimens of *S. flaviventris* bred in 1928 by Mr. Wm. Fassnidge from larvae found in Hampshire, were some which showed a greater or less amount of orange dusting on the scaled portions of the forewings, especially on the median band. Examples of this form, together with ordinary specimens, were sent to Herr Bang-Haas of the firm of Dr. O. Staudinger and A. Bang-Haas, for comparison with German specimens. Herr Bang-Haas compared the British insects with the two types of Stange, from Friedland (Mecklenburg) dated 12th and 27th. vii.81 in the Staudinger collection, and found that the types were quite without any orange dusting on the forewings. He added that the orange specimens might well be named, like other similar forms of *Aegeriidae*. The amount of orange dusting varies considerably. It may occur at the base of the forewing, along its costal and inner margins, and is most frequent on the median band. No specimens showed more than traces of it on the outer margin. It seems that *fulva* would be a suitable name for this distinct aberration.—HY. J. TURNER.

CURRENT NOTES AND SHORT NOTICES.

The *Trans. Cardiff N.H. Soc.*, for 1927 to hand contains a very fully annotated list of the Hymenoptera-Aculeata of Glamorgan from the pen of the veteran entomologist Mr. H. M. Hallett, F.E.S. In the *Trans.* some six or seven years ago a preliminary List of the Bees, Wasps and Ants of the county was published, and now matter has accumulated, the author has ably put the first portion in print. A short history of the study so far as the county is concerned with acknowledgments to the workers who have assisted, is followed by the detailed annotated list, each genus being introduced by a few general remarks. Of the 453 British species Glamorgan can claim 289 or 64%; that of Hampshire published in the *Ent. Record*, 1925-6, by H. P. Jones claims 82% with 370 species. Mr. Hallett also contributes a few notes on other orders of insects.

The *Irish Naturalist*, a magazine of Natural History, Antiquities and Ethnology, contains a large amount of interesting local Irish matter. In recent numbers we note, "Among the Bees and Wasps of 1927," by A. W. Stelfox; "A flight of Ants," by R. J. Welsh, and "Some Dragonfly Records from Co. Cavan," by G. C. Blackwood.

Lambillionæa for June contains another set of new aberrations of Lepidoptera. (1) *Opisthograptis luteolata*. Two thirds of the upper-

side of the forewing are suffused with a delicate vinous-brown colour, leaving the upper part of the basal area normal light yellow colour, with the discocellular spot and the triangular spot at the apex emphasised somewhat = ab. *poskini*. (2) *Gonapteryx rhamni*. The forewings over a large discal area tinted with pale rose colour but divided by the nervures which remain of the ground colour = ab. ♀ *roseotincta*. (3) *Pararge aegeria* subsp. *egerides*. By the union of several pale spots a wide uninterrupted antemarginal pale band is formed. On the hindwings there is a whitish-grey marking in the anal angle = ab. *eutactiata*. (4) *Amorpha populi*. Spots on the hindwings of a brown-yellow colour = ab. *tharomaculata*. (5) *Trachea atriplicis*. The basal area, the shade before the submarginal line as well as the upper spots are well characterised yellow instead of vivid green. The pale spot usually tinted rose in colour is clean white = ab. *epicanthana*. There are also new aberrations of *Papilio podalirius* and of *Parnassius apollo*.

In the *Int. Ent. Zeit.* of Guben for Aug. 15th it is interesting to read of the unusual occurrence and abundance of the larvae of *Heliothis peltigera* during 1927 in South Bavaria, where it fed in nature on the Deadly Nightshade, *Atropa belladonna*, especially in places fully exposed to the sun. This occurrence in abundance is rather interesting, as during the present summer the larvae have been in abundance all along the coast from the Thames Estuary to Sussex, where they fed on Stinking Groundsel, *Senecio viscosus*, at Eastbourne (Mr. R. Adkin), on *Convolvulus soldanella* at Deal (Dr. Cockayne) and on *Ononis* on the Cuckmere River banks (Mr. R. Adkin). The larvae found on these plants respectively could not be induced to feed freely on any other plant but the kind upon which they had fed in Nature. They did however eat marigold. Other recorded foodplants are Henbane (*Hyoscyamus niger*), Corn Feverfew (*Matricaria inodora*), Sandwort (*Arenaria*), Purple Sandwort (*Spergularia rubrum*), Marigold, Clover, Gorse, Thornapple (*Datura*), etc.

We understand that the Entomological Congress, held at Ithaca, New York State, in August last, passed off most enjoyably and successfully and that the Fifth Congress will take place in Paris in 1932, the centenary of the founding of the Entomological Society of France.

In the *Zeit. wiss. Insektenbiol.*, 5-7, there is an interesting and exhaustive biological account of the Arctiid *Ocnogyna loewi*, Zell., a species remarkable for its extreme polyphagous habit. There are recorded no less than 174 endemic and introduced species of plants of 62 plant-families upon which the larvae have been found wild near the Agricultural Experimental Station at Tel-Aviv, Palestine. The pupal stage lasts for eight months from April to December (the duration of dry desert-like conditions of the summer) and only one generation occurs per year.

In the current number of the *Vasculum* (Oct.) Prof. J. W. Heslop Harrison describes two new forms of British *Lycanidae*. (1) *Polyommatus* (*Aricia*) *medon* still occurs in County Durham in abundance and quite 90% of the specimens observed were found to show "the total disappearance of the black pupil in the discal scar on the lower side of the hindwings." It has been named ab. **carteri**. (2) *Polyommatus icarus*. This species was also examined and in the same area a similar

obsolescence occurred but only to the extent of less than 5%, although abundant transitions were noted. This form has also been named ab. **carteri**. It is a well-known fact that the variation in the family *Lycaenidae* runs throughout on extremely parallel lines. (See Courvoisier's writings).

Herr Riemel of Munich announces, in the *Int. Ent. Zt.*, Sep. 1st, the crossing of *Parnassius apollo* ♂ with *P. delius* ♀, which had not hitherto been effected. He names the hybrid *hofmanni*, of which only a ♂ was bred from the 42 fertile ova obtained.

In the *Int. Ent. Zt.* for Oct. 1st, Herr Bandermann describes a form of *Pyrameis cardui* as ab. *flava*, in which, instead of the white subapical, there is a pale ochre-yellow spot. But the most obvious feature of the specimen is the uniformly pale ochre-yellow ground of the hindwings which is without the black dots and the black marginal spots. On both sides of the forewings the whole of the black marking is strongly reduced.

In recent numbers of the *Ent. Rundschau*, Prince Caradja has an account of the micro-lepidoptera of the neighbourhood of Palermo, and Adelbert Seitz, Editor of *Seitz Macro-Lepidoptera of the World* is writing a series of articles on the Systematic Arrangement of the Rhopalocera.

Recent issues of the *Int. Ent. Zeit.* contain continued faunistic articles on the lepidopterous fauna of the Jena neighbourhood by Herr Volker, and of the higher parts of the Jura mountains by C. Vorbrodt. G. Warnecke, of Altona is contributing a List of the modern faunistic literature for Macro-lepidoptera of Central Europe, disposed in provinces and geographical areas. H. Stauder has an important summary of the effects, from a lepidopterological point of view, of the heat-wave of the midsummer of 1928, and lists almost thirty cross-pairings most of which were of the genus *Zygæna*, as a result of the abnormal temperature conditions.

The Feb. number of *Soc. Ent.* contains a valuable article on the aquatic Rhynchota of the salt lakes of Elton and Bascountchak in the lower Volga basin. The species listed are 21 in number and notes are given as to their frequency, etc., relative to the percentage of salt in the water, which varies from comparative absence after rains and floods to a considerable amount in the dry rainless parts of the year.

The *Ent. Zeit.*, of Frankfurt is issuing another volume of the "Handbuch" of which two volumes dealing with the Rhopalocera and the Sphingids, Arctiids, etc., have already appeared. The present one being issued deals with the Bombyces.

We have to record the deaths of several entomologists of world-wide fame. Prof. Dr. C. Aurivillius of Stockholm was known for many years as a lepidopterist, much of his work being upon the African fauna. For some years past he had also dealt with the larger species of Coleoptera. Dr. Theodor Becker was a Dipterist whose work has much advanced the knowledge of that order, and who was looked upon as the authority on some of its sections. Dr. von Dalla Torre of Innsbruck was a Hymenopterist whose Catalogue of that order ran to about a dozen volumes, bringing together what had hitherto been scattered in many publications and more or less difficult of access.

The *Amateur de Papillons* contains some very useful local articles in the few recent numbers issued. M. Chrétien has a series of articles on the *Acidalias* of the fauna of France; in the first four parts dealing with them in a general way as a group, habits, oviposition, the ova (colour, fertility indication, shape, surface, embryo, modifications, etc.), rearing of the larvae (conditions, time, generations, etc.). M. Stempffer is giving some detailed notes on the variation of some species of *Lycaenidae* found in France, summarising the work of Courvoisier, Oberthür, Verity, with his own observations upon, and experiences with, the various forms hitherto recorded. The veteran M. Rondou gives an account of an excursion to the higher Pyrenees, the valley of Camp Bielh, at the head of the "gave de Héas," with a long list of both macros and micros captured. There are notes on assembling, gynandromorphism and the lepidoptera found associated with the rare *Juniperus thurifera* in the Hautes-Alpes.

Recent numbers of the *Bull. Soc. ent France* contain among other matter an article (No. 11) by Dr. Verity "Some races of *Aricia medon*, Hufn., and of the different species *A. cranera*, Esch." mostly dealing with the forms occurring in the Iberian peninsula of which, when he previously dealt with the species, *Ent. Record*, 1920, pp. 145-152, he had no material. The Abbé J. de Joannis (No. 13) deals historically with the Coleophorid *C. flavaginella*, Zell., in an endeavour to clear up the very complicated entanglement of *C. flavaginella*, Zell., *C. flavaginella*, Mühlig., *C. moeniaceella*, Stainton (*maeniaceella*, auct.), *C. mühligella*, Wocke., *C. suaedivora*, Drnt., *C. flavaginella*, Meyr. He concludes that the true *flavaginella*, Zell., is from Livonia and Belgium, the British species is *suaedivora*, Drnt., and not *flavaginella* and the third species from both Germany and France is *moeniaceella*.

An Appeal.

The following appeal has been sent from the British Museum (Natural History), South Kensington, London, S.W.7.

May we ask your valuable assistance in connection with the study of the parasitic Diptera and parasitic Hymenoptera, ... which we are particularly interested? Our collections, although comparatively rich in African and Oriental material, are, in particular genera, deficient in bred series of parasites from the British Isles, and we are consequently addressing this appeal to you in the hope that those entomologists who breed Lepidopterous larvae will assist us in our endeavours to become better acquainted with the fauna of our own country. Will all who chance to read this letter be so good as to forward to us, at the British Museum (Natural History), South Kensington, all parasites that they may accidentally and unwillingly rear? Perhaps it should be added, firstly, that the material need not be mounted, but may be sent dry in tubes or boxes lightly packed with soft paper (*not* cotton wool), and, secondly, that the necessary data, together with the parasites' cocoons, should accompany the specimens.—E. E. AUSTEN, J. WATERSTON, D. AUBERTIN, D. S. WILKINSON.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Wanted for cash or exchange many common forms of British Jassidae. I will either buy or give good exchange in local insects of other families and orders. Will also buy literature relating to Jassidae.—Paul N. Musgrave, 514, Mount Vernon Avenue, Fairmont, West Virginia, U.S.A.

Desiderata.—Ova or pupae of *christyi*, *abruptaria* v. *brunnea*, black *consonaria* and *bidentata*, *extensaria*, *curzoni*, *jasionata*, *venosata* (Shtetl.) and other melanic Geometers and Noctuae.

Duplicates.—Very many in first class condition, high-set only f. i. *Herminia flavicrinis*, *Andreas*, *Nych. dalmatina* race *andreasaria*, Warnecke, about 30 species of rare *Acidalias*; pupae of *Eupithecia illuminata* or cash.—Karl Andreas, Wiesbaden, Goethestr. 23, Germany.

Duplicates.—Fine bred *prunaria* *grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brompton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), *Tenthredinidae* and *Aculeates*.

Desiderata.—Species of *Dolerine* and *Nematine* sawflies not in my collection; list sent.—R. O. L. Perkins, 4, Thurlstone Road, Newton Abbot.

Duplicates.—Bred *Sparganii*, *Ochroleuca*, *Maritima*, *Straminea*, and many other Noctuae.

Desiderata.—Pupae *Carpophaga*.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytoecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant-galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

Pairs of *Synanthedon flaviventris*, Stgr., bred Hampshire, 1928, in exchange for Entomological literature of any kind, especially foreign periodicals, proceedings and separata. Wm. Fassnidge, Hon. Librarian, Hants. Ento. Soc., 47, Tennyson Road, Southampton.

Wanted loan of series of *E. jurtina* (unusual aberrations not required) from East Anglia, N. and S. Wales, Northern England, Scotland (E. and W. sides), and Connaught, for study of geographical variation.—P. P. Graves, F.E.S., 5, Hereford Square, London, S.W.7.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. November 21st. December 5th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. November 22nd. December 13th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed.—Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

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All communications should be addressed to the Acting Editor, H. J. TURNER, "Latemar," West Drive, Cheam.

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BACK VOLUMES OF The Entomologist's Record and Journal of Variation. (Vols. I-XXXVI.)

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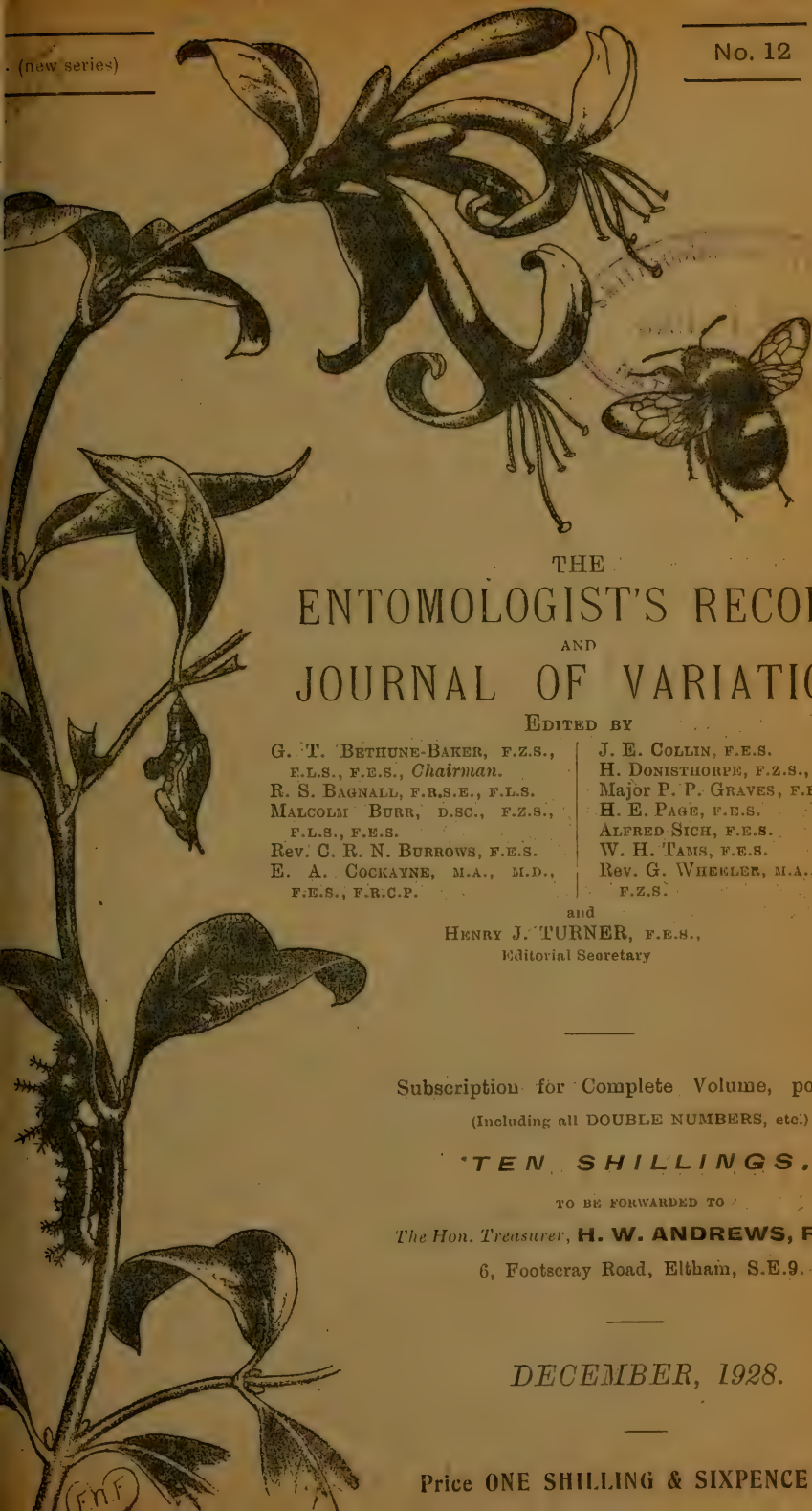
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Field Notes from Angola. XI.

By MALCOLM BURR, D.Sc., F.E.S.

THE RIVER MUNHANGO. AUGUST 14th, 1927.

The uplands of Angola, corresponding more or less to the extensive District of Moxico, are uncommonly well watered; the Benguela Railway runs for a considerable length of its route along the crest of one of the greatest watersheds of the world, the divide between the great river systems of the Congo and of the Zambesi. At a point called Munhango, 844 kilometres along the railway from the terminus at Lobito, the ground rises to an altitude of a little over 5000 ft., and from it various small streams radiate in different directions; one into the Lungue Bungue and so into the Zambesi, another, the Subengila feeds the Cuanza, a small, independent system which runs into the Atlantic at Loanda, and two others, the Camashila and the Munhango, feed the Kasai, which is one of the chief tributaries of the mighty Congo.

We have been camped for a little time in the valley of the Munhango, which is just like the other river valleys we have explored, a shallow depression in the sandy forest, filled with bog through which runs a clear and swift stream. They are all alike, and in this district at least all equally deficient in game. The population of this part of the Munhango consists of one oribi, one duiker, and a pair of francolins; we may secure them for dinner one day yet, or we may not. Occasionally it is visited by a passing roan, which, as big as a horse, means a generous supply of fresh meat.

When we arrived we were delighted to be welcomed by a brief spell of mild weather, and Orthoptera reacted at once and started chirping at night. Thus I was able to make the acquaintance of *Mecopoda*, as reported at the end of my last letter. He is a handsome big fellow, and seems to play the part of our *Tettigonia* in Europe, with the difference that he is a woodland insect. He strikes up his not unpleasant, low, but penetrating, shivering note soon after dark; though he is active and wary I did not find him so difficult to stalk down as the Decticids. The first one interrupted a conversation and, armed with an electric torch I walked straight up to him and took him with my fingers; the distance was eighty yards. Of the ten or dozen specimens taken so far, only one is green, the rest being a deep brown which corresponds well to the dry timber on which I found them; the green one probably prefers shrubs, but I was not able to observe him personally. Like *Tettigonia*, but unlike *Gampsocleis*, he seems to prefer to stand head downwards when singing.

Down in the river valley there is always a strong breeze blowing, and, after a brief spell of warm nights, the cold set in again with the moon, and all day long there is a strong wind. This however does not seem to check the activities of the marsh-loving butterflies and there are plenty of a fine electric-blue *Papilio* with black bands that dashes up and down the valley, apparently aimlessly, and never seems to settle, reminding one of the *yellowan* shearwaters that ceaselessly and restlessly scurry over the surface of the Bosphorus. These *Papilios* are powerful on the wing, and in the strong wind it was very difficult to catch them. Flying with them was a white and black one, that

seemed a trifle smaller; they were so friendly that I suspected them of marital relations, and now, after much patience and a good deal of luck, succeeded in catching one of each, I am pretty sure they are male and female in spite of the difference of coloration, for there is a general resemblance, only the beautiful electric blue of what I take to be the male is replaced by white, and a rich crimson flush on the underside is much more developed in the white one. I was strolling back to camp, pleased at having taken one of each, when my attention was arrested by a meeting held at a small puddle in the bog: here there must have been a couple of dozen of each, crowded and packed together enjoying the unsavoury looking water. I believe the orthodox method with lepidopterists is always to strike sideways, but here I felt I simply must break the rule, and banged my net down on top of the quivering mass of colour. A good number flew off in time; others escaped through the gaps left between the irregularities of the ground and the net, but my fluttering captives, which I fear knocked themselves about a good deal in the net before I could deal with them all, numbered half a dozen of the blue one and seven of the white. They are *Papilio anthens* and *P. pylades* respectively and seem to be common enough here.

In Orthoptera I find no noticeable change in the fauna. The desert-loving *Chrotogonus* occurs here and there, but not by any means commonly, along the desert strip that divides the forest from the bog, as well as a strange little desert-loving Acridian; the Stenobothrids are numerous enough, usually contrasting black and white in their pattern, to fit in with the white sand and the inevitable black burnt grass; one young Pamphagid larva, with a figure exactly like a knight of the chessboard, was quite black, evidently coming under the influence of the burnt grass instead of the white sand. An occasional red-winged *Acerotylus* reminded me of Europe, but I was glad to take an unfamiliar Oedipodid in the scrub, with clear wings very faintly tinged with yellow.

Mantids are not common: I have an immature of a large, untidy species, and a small grey one, perhaps *Perlantia*, comes dashing clumsily to light at night and sometimes commits suicide in the camp fire. The boys brought me a Phasmid of incredible slenderness, perhaps the male of the twig-like species already noted.

Another and extremely interesting Mantid is, unfortunately, not mature, but it shows its characteristics in a very striking manner; it seems to be one of the *Orthoderidae* and is coloured in a marbled black and white pattern exactly like the lichens on the dead trees which are so common here; when I placed it on a piece of lichen, it lay still and simply disappeared from eyesight; when I placed it on sand or any other background, it was active and energetic, running and jumping vigorously in the attempt to find an escape. It is interesting to note that the sinuosities of the anterior femora fit neatly into those of the sides of the pronotum, exactly as I have already noted in *Pyrgomantis*. The latter is a grass-inhabiting creature and has a cylindrical body: the front legs are tucked away therefore in a vertical plane, fitting neatly into the outline of the sides of the pronotum which are also in a vertical plain, so that the whole body is perfectly cylindrical. But in this Mantid, the body is flattened and broad; it lies close down, pressed on to the lichen which it haunts, just as the lichen itself is

flat and broad; moreover, it holds its front legs in a horizontal plain so that they appear to be a continuation of the broad, flat pronotum. This is the first instance that I have come across of a Mantid of this group so closely resembling a lichen. In an earlier letter I have described an identical and equally striking instance in the case of a *Harpax*.

A boy brought me another grey female Pamphagid, totally apterous; the entire colour is dull grey, to match the sand on which it lives. Now all these insects seem to have a love of colour, so I looked for the hidden spots, and found, of course, the thigh linings to be a bit bright: the inner face of the posterior femora is dark blue along the upper margin, speckled with white, and red below it. Then I looked at the neck membrane, which is visible only in fresh specimens, and so for long escaped the notice of entomologists working at home. In this case the neck membrane is pale green, with a deep velvety black spot on each side, and in the middle of each black spot there are two bright blue dots. It is interesting to note that a tinge of the pale green spreads to the back of the head capsule, exactly as though the colour had been put on with a brush and the head put in position before the paint was dry, so to speak. This odd phenomenon can be seen sometimes in the inner side of the femora of grasshoppers, though at the moment I cannot recall a case in point. Brunner has noticed the same thing.

Other interesting Orthoptera on the banks of the Munhango are an Oedipodid like *Aerotylus* with the wings faintly yellow and a very faint blackish fascia, and a small Acridian with acute vertex closely resembling a *Truxalid*; I took it, indeed for a *Stenobothrus* till I noticed the hooked process on the prosternum.

There has been a change in the climate during the past week, and we are clearly at a turn in the season. It is odd to the newcomer to see the curious blend of autumn and spring. A gust of wind will bring dead and dried leaves rattling down as in late October in Europe, yet the adjoining tree will be decked out in a delicate rosy red or pinkish russet of tender young foliage. No longer does one crackle through dead twigs and dried leaves when walking through the bush, which is now carpeted with young and luscious leaves and fresh growth. The early mornings are not so cold and the wind is less violent during the day and the sun is appreciably warmer. And in the afternoons a faint bluish haze can be seen hanging over the forest. The insects feel the change and the crickets are more lively at night, and last evening the frogs began their chorus.

The birds are moulting, too. We have shot one or two for specimens, but they are in poor condition. A nightjar, from which I hoped to take some interesting Mallophaga, disappointed me both in his personal cleanliness and the bad state of his plumage. There is a small, and very pretty, black and white shrike, with a bright yellow skin round the eyes; it flies in little flocks from shrub to shrub, but the plumage is not only thin and moulty, but actually grimy, as like that of a London sparrow, evidently the result of his hunting for insects among the burnt patches which now occupy so big an area in the fields and forest, now that the season of bush fires is in full swing. We suffer personally from the same thing, for a clean pair of breeches is soiled with soot after the first walk through the woods.

COHEMBA. AUGUST 21st.

We have moved down to a place called Cohemba, at kilo 782 along the line of the Benguela Railway, at an altitude of about 2500 ft. only and the climate is noticeably milder than at Munhango, where we were nearer the highest point on the watershed, about 5000 ft., but possibly the advancing season has something to do with the difference. The season reminds one of the early autumn in Europe; the vegetation is parched brown and the dry leaves and twigs in the bush crackle as one walks through them. And as in southern Europe we find lanky *Acrida* in the long grass, only with crimson or with yellow wings banded with black, instead of the faint yellow of our common European species; *Caloptenus* and *Oedipoda* are here too and several *Stenobothrus*, but of course represented by different species. * The mornings are mild and cloudy, a forecast of the first showers which are expected in a week or two. But there is this great difference between this season and our autumn; it does not mean the on-coming of the winter; the African "winter" is over, that is, the dry season, and we have not seen rain since April 20th, but a good dew has kept vegetation alive. It means the on-coming of spring, and already the forest shows abundant signs, as in our March; many of the trees are putting forth new foliage, not in light greens as with us, but in buffs and pinks and russets and even deep reds of the tenderest hue. These are interspersed among dead and leafless trees, and complete the illusion of autumn.

Some fresh Orthoptera are turning up. A boy brought me a *Saga*, not the dwarf species already reported from the grassy bogs, but an undoubted substantial *Saga* this time; in appearance it recalls our south European *S. serrata*, but this is noticeably smaller, though bigger and more powerful than our smallest species, the Macedonian *S. campbelli*; unfortunately, it is not fully grown, but the elytra and wings are developed, in contradistinction to those of our European monsters, where they are reduced to mere flaps serving only for stridulation. I look forward with interest to finding the adult and seeing the pattern of the elytra and wings; probably they will be dark and tessellated, like those splendid *Sagas* of the Transvaal.

In the dry scrub there is a pale *Caloptenus* with yellow belly and legs, a pepper-and-salt *Oedipoda* with red wings, noted from the Langiliko; it is a pretty species, with yellow legs and black and white marbled belly; there is the pepper-and-salt *Stenobothrus* with red belly, also noted from the Langiliko; I have heard *Mecopoda* with his shivering note and taken a very pale buff *Phaneroptera*, more spidery than any I have hitherto seen; his normal colour is doubtless green but he adapts himself to the prevailing tone of the dry season; the two species of *Acrida* fit in very well with the yellow or ruddy grass, but one I took, with yellow wings and black fascia, is deep green; he is probably a young specimen which has not yet had time to fade to the fashionable tint.

There is a beautiful waterfall here, with a drop of some 120 ft. or more, caused by a volcanic dyke, the rock of which decomposes to a rich red ferruginous loam or laterite and here we find a richer vegetation than on the generally prevailing sand. Here I found a small *Acridian* of a bright golden colour, varied with deep blue with crimson

spots on the pleuræ and belly, a very striking species ; the wings are golden yellow ; I presume this is the dry season form of a normally green grasshopper. The rainy season is coming on, so we shall see. Another interesting species is a small dingy Acridian like a *Stenobothrus*, with blue wings ; of this I have so far taken only one ; the small *Truxalid* with crimson wings has turned up again ; I have taken one pale fawn and another quite black.

Bird life is abundant here and there seems to be a considerable variety of warblers and finches ; the most striking bird that I have seen is the famous nightjar with long trailing racket-like feathers that is figured in all popular books on Natural History ; when I first saw it flying silently at dusk I could not make out what it was, for it looked liked two birds flying one on top of the other. Orioles too are common enough, but hardly so beautiful as our gorgeous and melodious European friend.

Dragon-Flies.

“ We had a power of dragon-flies at Sarn, of many kinds and colours, little and big. But everyone was bound, in due season to climb up out of its watery grave, and come out of its body with great labour and pain, and a torment like the torment of childbirth, and a rending like the rending of the tomb. And there was no year, since the first time I saw it, that I missed to see this showing forth of God’s power.

“ There were plenty of dragon-flies about, both big and little. There were the big blue ones, that are so strong, they will fly over the top of the tallest trees if you frighten them, and there were the tiny thin ones that seem almost too small to be called dragon-flies at all. There were rich blue kingfisher-flies, and those we call damsels, coloured and polished in the manner of lustre ware. There were a good few with clear wings of no colour or of faint green, and a tuthree with a powdery look, like you see on the leaves of ’rickluses. Some were tawny like a fitchet cat, some were rusty like the copper fruit-kettle. Jewels, they made you think of, precious gems such as be listed in the Bible. And the sound of their wings was loud in the air, sharp and whirring, when they had come to themselves after there agony. Whiles, in some mossy bit of clear ground between the trees, they’d sit about like so many cats round the hearth, very contented in themselves, so you could almost think they were washing their faces and purring.

“ On a tall rush close by the bank, I found one just beginning to come out of its body, and I leaned near, pretty well holding my breath, to see the miracle. Already the skin over its bright, flaming eyes was as thin as glass, so that you could see them shining like coloured lamps. In a little, the old skin split and it got its head out.

“ Then began the wrestling and the travail to get free, first its legs, then its shoulders and soft wrinkled wings. It was like a creature possessed, seeming to fall into a fit, times, and, times, to be struck stiff as a corpse. Just before the end, it stayed a long while still, as if it was wondering whether it durst get quite free in a world all new. Then it gave a great heave and a kind of bursting wrench and it was out.

"It clomb a little way further up the bulrush very sleepy and tired, like a child after a long day at the fair, and fell into a doze, whilst its wings began to grow."

The above quaint description of the habits of Dragon-flies is taken from "Precious Bane," by Mary Webb. Though not, strictly speaking, scientific, it is true to nature and moreover a rather fine word picture.—H.D.

Descriptions of a new Genus and new Species of Noctuidae. Subfamily Ophiderinae.*

By A. E. WILEMAN, F.E.S. and R. J. WEST.

[The specimens were collected by A. E. Wileman in Japan, Formosa and the Philippine Islands. All types in the Wileman Collection. Ridgway has been used as the standard for colours. Colour terms in italics are not Ridgway's. Patagium=collar-tippet, Tegula=wing-base-cover.]

Riaga gén.n.

Palpus: obliquely upturned, second segment reaching vertex of head, third segment as long as second segment, clubbed at tip. *Antenna* of female minutely ciliated. *Proboscis*: fully developed. *Fore-wing*: termen evenly curved; veins 3 and 5 near angle of cell; 6 from near upper angle; 9 from 10 anastomosing with 8 forming a long, narrow areole; 7 from near end of areole; 11 free. *Hind-wing*: termen evenly curved; vein 3 near lower angle; 4 at angle; 5 just above angle; 6 and 7 from upper angle; 8 anastomosing with cell near base only.

Genotype.—*Riaga radiata*, Wileman et West, sp.n.

The position of this genus in the sub-family *Ophiderinae*, is, between the genera *Giria* and *Nephelomorpha*.

Riaga radiata sp.n.

FEMALE.—*Palpus*: light-buff, obliquely upturned, third segment clubbed. *Antenna*: minutely ciliated. *Head*: frons light-buff, vertex light-buff tinged with wood-brown. *Thorax*: patagium and tegula light-buff tinged with wood-brown, a wood-brown tuft on metathorax. *Abdomen*: light-buff, above and beneath. *Pectus*, *Legs*: light-buff. *Forewing*: light-buff, a longitudinal wood-brown streak from base, through cell, then bent upward to apex; a suffusion of wood-brown irrorated with fuscous-black on inner margin near tornus, a small dash of fuscous-black at tornus. *Hindwing*: light-buff tinged with wood-brown on veins and subterminal area. *Underside*: *forewing* light-buff tinged with wood-brown on veins; *hindwing* light-buff tinged with wood-brown on veins, a wood-brown suffusion at apex.

Expanse 24mm. (*tip to tip* 22mm.)

HOLOTYPE. *Female*.—Palali, subprov. Benguet, Luzon I., Philippine Is. 2000 ft., I. 1910.

*Formerly Sub-fam. *Noctuinae*.—A.E.W.

Gesonía grisea sp.n.

FEMALE.—*Palpus*: fuscous, with drab-grey near extremity of second segment. *Antenna*: minutely ciliated, with paired setae. *Head*: frons and vertex drab-grey. *Thorax*: patagium and tegula drab-grey. *Abdomen*: drab-grey above and beneath. *Pectus*: drab-grey. *Legs*: drab-grey tinged with fuscous. *Forewing*: drab-grey irrorated with drab, costa edged with fuscous on basal quarter, fuscous spots on costa antemedially and medially, three fuscous spots on costa near apex; reniform indicated by a few fuscous scales; postmedial fascia drab, faintly marked, suffused into ground-colour on proximal side, distal edge defined by drab-grey, outwardly angled to vein 5, inwardly angled, and excurved to vein 4, oblique and incurved to inner margin; subterminal area suffused with drab, terminal line drab-grey, fringe drab and drab-grey mixed. *Hindwing*: drab-grey tinged with fuscous, termen fuscous, fringe drab and drab-grey mixed. *Underside*: *forewing* drab; *hindwing* drab-grey irrorated with drab, fuscous on discocellulars and termen.

Expanse 22mm. (*tip to tip* 21 mm.).

HOLOTYPE. *Female*. Baguio, subprov. Benguet, Luzon I., Philippine Is., 5000 ft., 22.VI.1913.

NEAREST ALLY.—*G. fallax*, Butl. (Japan, Philippines).

Blastichorinus luzonensis sp.n.

FEMALE.—*Palpus*: light-buff speckled with blackish-brown. *Antenna*: minutely ciliated, with paired setae. *Head*: frons with a smooth corneous plate, light-buff above, with lateral fuscous spot, vertex light-buff. *Thorax*: patagium light-buff tinged with avellaneous, tegula light-buff. *Abdomen*: light-buff above and beneath. *Pectus* and *legs*: light-buff. *Forewing*: light-buff lightly irrorated with natal-brown basally, and blackish-brown subterminally; antemedial fascia, a fine broken line of blackish-brown dots, ill-defined; orbicular indicated by a blackish-brown speck, reniform two cartridge-buff spots, faintly outlined with fuscous and connected by a fuscous bar; postmedial fascia a band of fuscous, outwardly oblique to vein 6, outwardly angled, and inwardly oblique to inner margin; a suffusion of fuscous at apex, and a suffusion of fuscous and warm-buff in subterminal area between veins 3 and 7, fuscous spots on veins subterminally. *Hindwing*: light-buff lightly irrorated with blackish-brown, with a band of fuscous medially, fuscous spots on veins subterminally. *Underside*: *forewing* light-buff lightly irrorated with blackish-brown, postmedial fascia, a faintly marked, fuscous, crenulate line; blackish-brown spots on veins subterminally, termen fuscous; *hindwing* similar.

Expanse 44mm. (*tip to tip* 41mm.).

HOLOTYPE. *Female*. Palali, subprov. Benguet, Luzon I., Philippine Is., 2000ft., I.1913.

NEAREST ALLY.—*B. ussuriensis*, Brem. (Japan, Formosa, China).

Loxiodes assimilis sp.n.

MALE.—*Palpus*: cartridge-buff, wood-brown outwardly. *Antenna*: bifasciculate. *Head*: frons and vertex cartridge-buff. *Thorax*: patagium and tegula cartridge-buff tinged with avellaneous. *Abdomen*: (description impossible as it is missing from the type). *Pectus*:

cartridge-buff. *Legs*: cartridge-buff, wood-brown outwardly. *Forewing*: cartridge-buff, irrorated with fuscous; orbicular indicated by a fuscous-black speck; postmedial fascia, a suffused fuscous band, oblique and slightly incurved to inner margin medially; a little beyond this fascia, and parallel to it, a fine, faintly marked fuscous line; subterminal fascia fuscous-black, parallel to postmedial fascia, proximal edge sharply defined, distal edge suffused; subterminal area tinged with fuscous, termen fuscous. *Hindwing*: cartridge-buff, post-medial and subterminal fasciae fuscous and parallel with termen from vein 6 to inner margin; termen fuscous. *Underside*: *forewing* cartridge-buff suffused with wood-brown on upper half, postmedial fascia faintly showing through from upper side; *hindwing* cartridge-buff irrorated with wood-brown, postmedial fascia faintly showing through from upper side.

Expanse 26mm. (*tip to tip* 23mm.).

HOLOTYPE. *Male*. Baguio, subprov. Benguet, Luzon I., Philippine Is., 5000ft., 12.III.1912.

NEAREST ALLY.—*L. similis*, Moore. (Formosa, China, India).

(*To be continued.*)

Coccinellid Hybrids. A Provoked Communication.

By T. FRED MARRINER, F.E.S.

Mr. Leman, writing upon Coccinellid variations in the *Ent. Record* of ante p. 35 refers to an article by Prof. Capra of Genoa, in which it is pointed out that the hybrid named by me *Coccinella biabilis* is really the form of *C. variabilis* named by Linnaeus as *C. 10-pustulata*, and Mr. Leman wonders what I may have to say on the matter. I can only say that I have no sufficient reference library here to verify what Prof. Capra says, but I am quite willing to accept his statement. This only goes to show that the form is a very old established one, which, of course I knew, as did others, for I should think it appears in every British Collection. But does Prof. Capra's statement do away with the fact of its hybrid origin—the 'point of my paper'? I did my best at the time to discover whether the form had been named but no one, to whom I submitted it, recognised it for the *10-pustulata* mentioned by the Professor, hence when submitting the results of my experiments (since confirmed by other workers) to the Entomological Society of London, I proposed the name *C. biabilis* as denoting the origin of the insect. I had quite a voluminous correspondence over the matter, and, until Prof. Capra noted it, no one in any way criticised the name, and certainly *biabilis* seems eminently suitable and distinctive. I have not, unfortunately, seen the article by Prof. Capra, referred to by Mr. Leman, but anyone who has experimented in the breeding of *Coccinellidae* knows that hybridisation is common, at any rate, under the artificial conditions of the laboratory, and soon comes to the conclusion that our present Classification of the group requires some revision. The experienced Coleopterist may, nay can, at a glance distinguish *C. variabilis* (*10-punctata*) from *A. bipunctata* but can anyone give me in plain language to be put before a mere beginner a worded distinction between the two—leaving out the colour of the legs which is not invariable? Further, in my experience of *C. biabilis* at least 10%,

probably more, have the black legs of *A. bipunctata* while the rest have the pale variety of *C. 10-punctata*.

Can anyone explain this, except as a result of the crossing between the two species? My work on this group has brought me to two conclusions, viz :

Either the two present species *A. bipunctata* and *C. 10-punctata* have originally been one and gradually become two via an intermediate form which might be *C. biabilis*, or if two species originally, these are gradually merging into one represented by *C. biabilis*. So far as my outdoor work in Cumberland is concerned, during the last 12 years of observation I am inclined to the latter of these alternatives. But these changes of nature, these evolutions, are so slow that neither Prof. Capra, nor Mr. Leman, nor myself will be alive to say "I told you so," by the time the change is completed.

As another example of—shall I say 'probable instability' among our *Coccinellidae* I might mention the case of a form to which Mr. Dollman called attention in the *Ent. Rec.* 1912. plate 11, a form of *Mysia oblongoguttata*, which he names var. *nigroguttata*. On coming across his note I examined my series of this insect and found I had the same form bred from an accidental mating in my cages between *M. oblongoguttata* and *A. ocellata*. Last summer I tried a mating to verify or disprove my former note, and, though the resultant imagines were not exactly var. *nigroguttata* they had the same characteristic markings; mating two of these hybrids proved abortive; mating a ♂ hybrid with ♀ *A. oblongoguttata* or ♀ *A. ocellata* produced fertile ova, which unfortunately did not come through the larval stages successfully.

As this var. *nigroguttata* has been recorded from more than one locality since the time of its recording and naming, and as both *M. oblongoguttata* and *A. ocellata* are found in all those localities, we have here probably another example of the same happening as in the case of *C. biabilis*.

The Butterflies of Jebel Qineisa, Lebanon.

By P. P. GRAVES, F.E.S., and R. ELDON ELLISON.

The authors of this paper have paid several visits on various occasions to this mountain which is situated in the Central Lebanon immediately North of the Beirut-Damascus Railway. There are two passes traversed by high roads, reaching a maximum altitude of over 5,000 feet on each side of the mountain, the Azuniyah Pass to the North and the Khan Murad Pass to the South of it. The rocks are mainly calcareous. The surface where not rocky is occupied by mountain meadows and the thin stony cornfields which are a monument to Lebanese optimism. There were once some larches in the Northern Pass but they have vanished, presumably owing to the war, and there are now very few trees in the area. The most recent French survey gives the summit of Jebel Qineisa an altitude of 2091 metres (about 6850 ft.).

The senior author visited the mountain twice in May, 1905, and early in August, 1907. He also received some specimens taken by Signor F. Cremona above Hammana village on the Western slopes of the mountain. Mrs. Nicholl and the late Colonel H. J. Elwes spent

May 19th and 20th, 1900, on Qineisa, on the Eastern side. The junior author visited it on several occasions in June, July and August in 1927, and in the current year. In the following list, the months are given in Roman numerals: b.m.e. preceding them signify beginning—1st-10th, middle—11th-20th, and end—21st-end respectively.

(C)=taken by Cremona. (E)=taken by Ellison. (G)=taken by Graves. (N)=taken by Mrs. Nicholl.

Papilio machaon, L., ssp. *asiaticus*, Men. Congregates on hilltops, scarce elsewhere (E).

Iphiclides podalirius, L., ssp. *virgatus*, Butler; just reaches Hammana and Ain Sofar on the West slope and seems to have its vertical limit there at about 4,000 feet (G).

Thais cerisyi, God., ssp. *deyrollei*, Obthr.: m.V.1905 (G).

Parnassius mnemosyne, L., ssp. *libanotica*, Bryk.: Above Hammana VI. (C). High on Jebel Qineisa 19th, 20th, V.1900 (N).

Aporia crataegi, L., ssp. *meridionalis*, Vrtv.: m.V. (G). b.VI. very worn (E).

Pieris rapae, L., trans. ad *leucosoma*, Schaw.: worn b.V. (G). Not common in the summer (E).

P. daphidice, L.: Very general (E). Out at over 4,000 ft. b.V. (G).

Euchloë charltonia, Donz., ssp. *penia*, Frr.: In a col on the North side and near Dahr el Baidar on the South side locally, e.V.-b.VI. (E).

Gonepteryx cleopatra, L., ssp. *taurica*, Stgr. Not common (E).

G. rhamni, L., ssp. ? or *G. farinosa*, Z.: a ♂ seen b.VIII.1907 (G).

Colias croceus, Fourc. Very common.

Argynnis niobe, L., ssp. *philiatra*, Seitz.: fairly common on the North side in damp places where bracken grows.

Issoria lathonia, L.: not plentiful on North and South slopes b.m. VI. (E).

Melitaea didyma, O., ssp. ? rare m.V. (G): uncommon on West slope (E).

M. trivia, Schiff., ssp. *syriaca*, Rbl. Scarce (E).

M. cinxia, L., ssp. ? : at 4500 ft. very small and pale with antemarginal row of spots on hindwings almost or altogether obliterated, 19th, 20th V.1900 (N).

Polygonia egea, Cr.: Widespread but not common (G.E.).

Pyrameis cardui, L.: Everywhere.

P. atalanta, L.: One b.VIII.1907 (G.).

Limnitis rivularis, Scop.: One, half way up the South slope, an unusual capture on a treeless mountain.

Melanargia titea, Klug, ssp. *palaestinensis*, Stgr.: In cornfields nearly to summit, lasts into VIII. (E).

Hipparchia persephone, Hb.: (= *anthē*, O.) less common than at lower levels (E.). Lasts all through the summer from b.VI. (G).

H. telephassa, Hb.: like the preceding (E).

H. pelopea, Klug: abundant, VI.-VIII. (E).

Satyrus fatua ssp. *sichaea*, Led., one or two seen b.VIII.1907 (G).

S. cordula, F.: ssp. ? Seen several times VII., VIII. (E).

Pararge maera, L., ssp. *orientalis*, Stgr.: fairly common and widespread (E).

P. megera, L.: less common (E).

Epinephele telmessia, Z.: once only in June (E).

Hyponephele lupinus, Costa., ssp. ? *intermedius*, Stgr.: not uncommon but singly (E).

H. lycaon, Rott., ssp. *libanoticus*, Stgr.: a number on one stony hilltop b.VIII.1907 (G).

Coenonympha pamphilus ssp. *thyrsides*, Ist.gen. m.V.1905 singly (G). On South side chiefly in valley b.VI. (E).

Strymon myrtales, Klug: abundant b.m.VI. on col on North side and near the top (E).

Lycaena thetis, Klug: scarce in gullies on South side, b.VIII. (E).

L. thersamon, Esp.: 19th, 20th, V.1900 (N).

L. asabinus, H.S.: on East side of the mountain 19th, 20th, V.1900 (N).

L. phlaeas, L.: here and there (E).

L. doris, Hfn.: one from above Hammana e.V.1907 (C).

Cigaritis acamas, Klug: once half way up South side (E), b.VIII.

Lampides boeticus, L.: occasionally up to summit (E).

G. cyllarus, Rott., ssp. *aeruginosa*, Stgr.: one very worn above Ain Sofar e.V.1905.

Plebeius sephyrus, Friv., ssp. *nicholli*, Elwes., abundant near the top VI-VII., less abundant lower down (E).

P. loewii, Z., ssp. ? : common in cornfields high up on the mountain m.VI-b.VIII and once taken at 5,000 ft. on the South side (E).

P. medon, Esp., ssp. *cramera*, Esch.: here and there but not common (E).

Polyommatus anteros, Frr., ssp. *crassipuncta*, Chr.: Col on North side and at the top, not common (E).

P. candalus, H.S., ssp. *isauricoides*, Graves: once only at c.6,000 ft. m.VI. (E).

P. icarus, Rott., ssp. *zellericus*, Vrtv: Mercifully less common than lower down.

P. amandus, Schn., ssp. ? On the Southern Pass e.V.1907 (G).

P. meleager, Esp., ssp. *ignoratus*, Stgr.: fairly common in cornfields near top VII.-b.VIII. (E).

P. coridon, Poda, ssp. *syriacus*, Tutt: in cornfields with *meleager* and not rare in the col on the North side VI.-VIII., "apparently in two broods, but they seem to overlap" (E).

P. admetus, Esp., ssp. *ripartii*, Frr.: not rare with the preceding ssp. VII.-VIII. (E). Rare in the pass lower down on the south side (E).

P. semiargus, L., ssp. *antiochena*, Led., *helena*: on East side of the mountain 19 and 20.V.1900 (N).

Hesperia serratulae, Rbr., ssp. *alveoides*, Stdgr.: near summit, not very common b.VII. (E).

Adopaea lineola, O.: fairly plentiful here and there on South side VI. (E).

A. flava, Brunn., ssp. *syriaca*, Tutt: on South side generally lower down than *lineola* (E).

A. sylvanus, L.: One from above Hammana b.VI.1905 (C).

Urbicula comma, L., ssp. *pallida*, Stdgr.: quite common and widespread e.VII.-VIII. (E. & G.).

In addition to these spp., *Pieris ergane*, HG. and *Polygonia c-album*, L., were doubtfully identified on the summit.

The above list covers the high ground from about 4,200 feet to the summit, and includes 60 species certainly identified.

Mr. Ellison adds the following data which will interest collectors in Syria.

Turania (Scolitantides) vikrama, Moore, ssp. *clara*, Stgr. (= *baton*, ssp. *clara*, Stgr.): occasionally in VII. on the ridge from Aleih to Suq-el-Gharb (Lebanon) and beyond. One III., 1927, at the Dog River, Beirut.

Chilades galba, Lederer: near Antelias, North of Beirut near coast, not common, e.VI. (This is the first Beirut record since Lederer's description in 1855.)

Azanius jesusi, Guer., ssp. *gamra*, Led., *Virachola livia*, Klug, *Gegenes lefebrei*, Ramb., all abundant at Nahr Mut between Dora and Antelias in the Beirut Delta VI.-VII., 1928.

Baoris zelleri, Led.: near Dora e.VIII.

Sloperia proto, Esp., one e.VIII: on hill between Aleih and Suq-el-Gharb.

Some Remarks on the Rearing of *Callophrys avis*, Chap.

By BRIGADIER GENERAL B. H. COOKE, C.M.G., C.B.E., D.S.O.

I gave a short account of my efforts to find *Callophrys avis* on the Riviera coast in Vol. LX. of the *Entomologist* (p. 104). This last spring (1928) I was again in that district and renewed my search. As is well known, *Arbutus unedo* grows abundantly along the whole coast between Cannes and Hyères, and I spent a considerable time visiting various localities between those two places in search of this very elusive insect. However I only found it in one spot, i.e., the neighbourhood of Cavalière.

Between St. Aygulf and Ste. Maxime the conditions are almost identical with those at Cavalière, and the hill-sides are covered with the *Arbutus*, yet, although *C. rubi* was everywhere abundant, not a single specimen of *C. avis* was to be seen.

On March 27th, a lovely warm spring day, I visited Cavalière, and among a number of *C. rubi* took one male *C. avis*. I found, however, that owing to recent heath fires the "maquis," or undergrowth, was being shaved off and burnt, a considerable amount of *Arbutus* being burnt at the same time, no doubt with disastrous results to insect life. I stayed at Cavalière from April 3rd to 6th, and during three strenuous days of searching took two fresh male *C. avis* and one fresh female. The female was taken on April 5th, and I kept her alive.

I have noticed that when not sitting on the *Arbutus* bushes *C. avis* is very fond of feeding on the flowers of the Mediterranean lavender, I therefore collected some of the flowers, sprinkled some drops of sugared water on them, and placed them together with a sprig of *Arbutus*, in a flower vase, enclosed the whole in a large gauze cage, and placed the female inside.

April 6th, 7th and 8th were dull and wet, but the 9th was warm and sunny, and the gauze cage having been placed in the sun she began sucking at the sugar on the flowers. At about 1:30 p.m. she hopped on to the sprig of *Arbutus* and began to lay about two eggs at a time, flying off on to the gauze during the intervals. The eggs were mostly laid on a bud at the tip of the sprig, a few on the stem, one on a small leaf, and one in the angle formed by a leaf with the stem of the sprig. Ten eggs were laid that day. On April 10th, 7 or 8 more

eggs were laid, and on the 11th, another sunny day, about 10. On the 12th very few, if any eggs were laid. The 13th was a hot sunny day, and she laid a number of eggs. The 14th and 15th were dull and showery, but the 16th was sunny again, and a few more eggs were laid in the forenoon. From this date no more eggs were laid, and the lady, by this time very battered, soon died. In all about 42 eggs were laid, the majority around buds at the tips of the *Arbutus* sprigs.

About this time I proceeded to Corsica, and as I was afraid, quite needlessly as it transpired, that I might be out of reach of the foodplant, I left the bulk of the ova with Colonel G. H. Evans at Valescure, he having kindly offered to feed them for me during my absence. The balance of 6 ova I took with me. The remaining notes are from our combined experience. Colonel Evans moved to Challes-les-Eaux in Savoie at the beginning of May, and had considerable difficulty in procuring supplies of *Arbutus* while there, having to send a distance of 50 kilometres for it. Also the weather was at times very cold, which caused some deaths among the larvae.

The first two larvae hatched out on April 22nd, the bulk of the remainder on the 23rd and 24th, one on the 25th and the last on the 26th. The larva makes no attempt to eat the empty egg-shell, and when first hatched is yellowish grey, almost smooth except for a few longish hairs, and has a lighter stripe along the sides and one along the back; the head is black. They measure under 3mm. when first hatched, and feed while young on the surface of the tiny tender leaves of the opening bud.

The first moult took place on May 3rd and 4th. The larvae about that time measured from 5 to 6mm. and were green with paler lateral stripes. Between May 12th and 15th the 2nd moult took place, after which most of the larvae were green with pale yellowish lateral stripes, and a row of warts on the back, each provided with a tuft of short reddish hairs. Colonel Evans states that one or two of his larvae were of a darker shade. The head was black and shiny, and could be protruded or withdrawn at will. They now measured from 9 to 10mm.

Between May 22nd and 24th the larvae moulted for the 3rd and last time; a few of Colonel Evans' died at this period, possibly owing to cold weather. They were now green, and covered with short reddish hairs, the warts having disappeared. The only markings were a yellowish green line along the sides, and a dark brown crescent mark behind the first segment, which only showed when the head was bent forward. At no stage was any tendency to cannibalism observed.

On May 30th one of my larvae ceased feeding, and another on June 1st. These I placed on a sprig of *Arbutus* in a muslin bag, around which they wandered. They turned a dark purplish red with a sort of "shot" green appearance overlying the red. The full-grown larvae measured roughly from 12 to 14mm. My larvae spun two *Arbutus* leaves together at the edges, forming a right-angled shelter, and attached themselves lightly in the angle by weak threads. Those reared by Colonel Evans were placed in boxes containing fine moss and broken leaves or fine leaf mould. He states that only two attached themselves by weak threads to leaves, the remainder pupated on the floor of the boxes. The first two larvae pupated on June 6th, three on the 7th, the bulk of the remainder on the 8th, 9th and 10th, and the last two

on the 13th and 14th respectively. In all 22 pupated, three more died during the process. The larvae are easy to rear, and the discrepancy between the number of ova laid and the pupae obtained is partly due to the fact that some of the tiny larvae got lost when first hatched, and partly to the cold weather in Savoie during May.

The pupae measure from 5 to 6mm. in length; they are short and stumpy, and are purplish brown, sprinkled with black speckles, and covered with a brown pubescence. The wing cases are darker. They are at present (November) hibernating in England, and are apparently healthy.

REVIEWS AND NOTICES OF BOOKS.

INSECTS.—By F. Balfour Brown. Messrs. Ernest Benn, Ltd., Fleet Street, E.C. (Benn's Sixpenny Series).—"Tis but a little book, but one that must not be measured by its size. The name of the author ensures that the matter is not only well chosen and reliable in detail, but that it is welded together with both literary and scientific skill. It is not a reshuffle of the usually cited facts and foundations of entomological science, but a skilful exposition of what the aim should be in "the training of an entomologist." We have a detailed statement of insect "structure, habit and relationship to man" and a summary of "the lines of training adopted for an Economic Entomologist" to equip him for the work so necessary in the more distant parts of our Empire. The Chapters: I., Entomology in Relation to the Affairs of Man. II. The Study of Structure and Function. III. Insect Parasites and Predators. IV. Insects and Plants. V. The Geographical Distribution of Insects and VI. A Bibliography of 22 items. The abundance of biological incidents used in the 80 pages will be found to be new to most general readers of this fine little work. Get it.—Hy.J.T.

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From time to time we shall publish notes from the pens of experts on the different subjects of the chapters in Mr. Donisthorpe's book on the "Guests of Ants."

EXCHANGES.

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Duplicates.—*Strangalia aurulenta* (Col.), *Tenthredinidae* and *Aculeates*.

Desiderata.—Species of *Dolerine* and *Nematine* sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

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IMPORTANT

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The Entomologist's Record and Journal of Variation.

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GENUS *Acronyctus* and its allies.—Variation of *Smerinthus tiliae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthenie*, and *aurelia*—The Doubleday collection—Parthenogenesis—Paper on *Taeniocampidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the inter-Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist or 1890—Lifehistories of *Agrotis pyrophila*, *Epnoda lichenea*, *Heliophobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc., 360 pp.

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**An Account of the Hemiptera-Heteroptera of Hampshire and the
I. of Wight; with additional notes on British Species
not recorded for the County.**

By HUGH P. JONES.

Although rendered as complete as possible the following list can yet hardly be considered as truly representative, and has in fact, so far as the mainland is concerned, its chief origin in captures made in the New Forest and at Bournemouth, from time to time, by collectors primarily interested in orders other than Hemiptera. The I. of Wight may be judged to be fairly well worked by Hemipterists, and a list of species known to occur there was compiled some years back by Butler at the instance of F. Morey, a resident, for the latter's publication *A Guide to the Natural History of the I. of Wight*. Many of the records in the *Guide* were apparently contributed by Morey himself, and the total there formed has not been much exceeded in the present pages. The apparent absence of a resident Hemipterist in the New Forest district is much to be regretted, particularly when one remembers the long and relatively little explored coast line.

Covering as they do all the British species known to date, the carefully revised generic and specific characters contained in the list may be acceptable. With the plate, just sufficient prefatory matter has, I think, been added to make these intelligible to the uninitiated, who should, however, understand that a given negative character is perhaps only one out of half-a-dozen others almost equally applicable, and also that a lens (platyscopic) of moderate power is needful for the proper working out of the distinctions. The larval characters given under families, etc., are mainly taken from Butler's *Biology of the British Hemiptera-Heteroptera*; apart from these the distinctions throughout are, of course, intended to apply only to the adult insect. The classification employed largely follows, for convenience, the last (1908) British Catalogue, but where the nomenclature differs from a more recent continental ruling the differences are always given for reference.

The following abbreviations have perforce been used (not necessarily throughout):—

Pal.=Palaeartic, Br.=British (or Britain)—used generally comparatively, *e.g.*, Pal. 33, Br. 8, signifies that out of 33 known Pal. species 8 occur in Br. O.C.=Oshanin's Catalogue [Pal. species]; H.-H.Br.Is.=H.-Heteroptera of Br. Islands (Saunders); B.Br.H.-H.=Biology of Br.H.-H. (E. A. Butler, 1923); N.H.I. of W.=Guide to Nat. Hist. of I. of Wight (Morey); E.M.M.=Entomologist's Monthly Magazine; Mus.=Museum; Coll.=Collection. For the further saving of space in the later portions at least of this paper I have also been obliged to shorten certain of the more constantly recurring structural terms used, but only upon instant repetition. A glossary of terms, etc., will be found in the appendix.

To Prof. J. W. Carr my best thanks are due for the kind loan of

important literature and specimens during the course of this paper, whilst for valuable help with the records I am indebted more particularly to the following entomologists: Messrs. P. Harwood, C. Morley, J. J. Walker, F. J. Killington.

INTRODUCTION.

HEMIPTERA, OR RHYNCHOTA.—Metamorphosis incomplete; mouth in the form of a beak or rostrum adapted for piercing and sucking; wings, when developed, four in number.

Sub-Order HETEROPTERA (True Bugs).—Front of head, except in certain aberrant aquatic genera, not sharply inflexed, the head itself usually porrect; elytra placed more or less horizontally in repose, the tips membranous and flexible, the basal parts horny. Antennae concealed in Cryptocerata, otherwise always very evident, long and free.

Sub-Order HOMOPTERA (Cicadas, "Frog-hoppers," etc.).—Front of head much inflexed, touching coxæ; elytra usually obliquely placed at rest like the two sides of a roof, either membranous throughout or entirely horny. Antennae in the majority of families short and inconspicuous—hair-like apically.

HEMIPTERA-HETEROPTERA.—Rostrum with three or four joints, produced from undersurface of head (which is channelled to receive the first joint in repose), and placed back when not in use between the legs; usually long, and adpressed to undersurface of thorax at rest, but short and curved in some genera (*e.g.*, *Nabis*) hence not pressed flat against the underside. Antennae with from three to eight joints, four most usually. Front pair of wings, or elytra (more properly hemielytra), largely horny, or coriaceous; hindpair entirely membranous, and folded up in repose under elytra; both sets of wings frequently undeveloped. Apices of elytra overlapping when the wings are closed so that the suture is not straight, as in beetles. An elytron is made up of from three to five distinct divisions, *viz.*, Corium, practically the main opaque part of wing; clavus, a narrow section adjoining the scutellum; membrane, the apical transparent portion; cuneus and embolium, small divisions bordering the membrane found in *Capsidae*, *Cimicidae*, etc. Tarsi of legs with either one, two, or three joints—flattened (oar-like) and hairy in the swimming *Corixidae*.

Head.—Variable in shape, but almost always porrect, eyes usually near, although occasionally (*e.g.* *Coreidae*) very distant from thorax; in some genera pedicellate. Ocelli, when present, two in number. Sides of head in front of eyes with two strong tubercles, often pointedly produced laterally, from which issue the antennae. Face composed of three lobes, one on each side forming "cheeks" (genae), one in front; beneath the central lobe, adpressed over the base, of the rostrum, is the labrum.

Thorax.—Pronotum very large, and with the scutellum usually produced backwards, as in beetles; generally more or less triangular, with the lateral angles very prominent, and often constricted into a "collar" in front. Mesonotum merged in scutellum. On the metasternum beneath is situated the characteristic scent-gland, or

odoriferous sac, the two openings to which (sometimes hidden) take various forms.

Abdomen.—Flattened above, and largely concealed by elytra, which project behind, the lateral margins often much developed, and distinguished as “connexivum”; beneath seen to have a very short basal segment, followed by five well-defined divisions, beyond which appear the so-called genital segments (see *Gerridae*).

Female in certain groups with complete ovipositor, and male with what are known as genital styles on each side of apical aperture.

LARVA.—Active, with well-formed legs, rostrum, and antennae, but without wings (although the rudiments, of course, appear in the last instar, or nymph); orifices to scent-glands on dorsal instead of ventral surface; tarsi with two, antennae with four joints; ocelli absent. Frequently very metallic, and more flaccid than adult.

Form extremely variable in both adult and young; beetle-like perhaps in main, but in not a few predaceous species ant-like, mantis-like, or even gnat-like (e.g., *Ploiaria*). Colours usually sober, greens or browns variegated—often brightest on scutellum—but sometimes exceedingly brilliant (scarlet, metallic blue, etc.).

Habitat, etc.—When not occurring exclusively under water, as in Cryptocerata, generally found on or about vegetation, particularly in woods, or on heaths or sand dunes. Coastal regions seem always the most productive in this country. Sweeping and beating afford the most convenient means of collecting in the field, but the insects are very delicate, and should therefore never be placed together in a killing-bottle. Cabinet specimens should be carded like beetles, but preferably in such a manner as to show the underside as well. To revive the colours, or for the avoidance of “grease” (often a trial in the Hemiptera) the less fragile specimens may be “floated” from their cards when thoroughly dry, soaked in benzine or similar solvent for several days, and then mounted afresh, using the smallest possible amount of gum.

GYMNOCERATA.—In this section, the land bugs, the antennae are free, *i.e.*, not hidden in foveae under the head.

Fam. 1. **Pentatomidae**.—Antennae 5-jointed (in European species); body short and wide, either sub-globular or sub-triangular; the scutellum reaching to the base of the membrane, or, in *Scutellerina*, etc., almost or completely covering it.

[*Larva*.—Body short, nearly circular when quite young, more or less punctured; tarsal joints stout, cylindrical, basal joint shorter than apical; antennae and legs rather robust].

Sub-Fam. 1. **SCUTELLERINA**.—Scutellum very nearly or quite concealing the wings. Tibiae without spines. Pal. 84, Br. 4.

Odontoscelis, Lap.—Oval, very convex, covered with short hairs. Scutellum covers all of the hind body in a manner similar to the wing-cases of beetles.

O. fuliginosa, L.—Brownish, with darker and paler markings, usually with a pale dorsal stripe. L. 6-9 mm. Sandown, I. of Wight (Champion). A coast insect.

O. dorsalis, F.—Rather similar, but with bands of silvery hairs on upper surface; dark streaks on scutellum more curved. L. 4 mm.

Sandown, I. of Wight (Champion). In dry sandy places, not necessarily on coast.

Eurygaster, Lap.—Scutellum not quite concealing wings. Comparatively large, flat species, dull brown in colour.

E. maura, L.—Sides of prothorax straight, not curved as in the only other British species, *E. nigroocellata*, Gze. (*E. austriacus*, Schr. v. *frischii*, Gze.). Nr. "Lyndhurst Road" Station, N. Forest, May, 1895 (C. Morley). Parkhurst Forest, I. of Wight, 10.viii.07 (F. Morey; N.H. I. of W.). Most often obtained by sweeping rank vegetation in woods, etc.

Sub-Fam. 2. GRAPHOSOMATINA.—Scutellum much as in last group, but there are differences in the wing venation. Pal. 91, Br. 1.

Podops, Lap. *P. inuncta*, F.—Dull brown, with two curious appendages on front angles of pronotum. Pitts Deep, nr. Lymington (P. Harwood); Royden, N. Forest, in sand pit (H. P. Jones). Generally distributed in I. of Wight, as is also probably the case on mainland. Occurs on ground, at roots of plants usually, and is thus liable to be overlooked.

Sub-Fam. 3. CYDNINA.—Tibiae strongly spined. Scutellum in *Thyreocoris* is almost like that in *Odontoscelis*, otherwise only reaching base of membrane.

Thyreocoris, Schr., *T. scarabaeoides*, L.—Small, semi-globular, bronzy; scutellum hiding membrane. Bournemouth (Blatch). I. of Wight: St. Boniface Down, June, '85 (Morey). On ground in moss, under dead leaves, etc.

Cydnus, F., *C. flavicornis*, F.—Abridged description: Dark piceous brown—membrane paler—shining; sides with a series of short reddish hairs; head margins reddish, set with short brown spines; scutellum largely and rather remotely punctured; membrane brownish-white. Tibiae very densely spinose. L. $3\frac{1}{2}$ m.m. First taken in Britain at Fresh Water, I. of Wight, July, 1895, by W. W. Holland. Close search might disclose it on the mainland. It inhabits "dry sandy and grassy places," and has been noticed on *Centaurea scabiosa*. Butler (B.B.H.-H.) has found it in Jersey "quite buried in sand."

[*Geotomus*, M. & R., *G. punctulatus*, Cost.—This species very possibly occurs in Hants, and seems to have similar habits to the last. A variable insect, it is usually black in colour with the membrane whitish, with long remote hairs on the head and pronotum, a closely if finely punctured scutellum, and strongly spinose tibiae.]

Sehirus, A.S.—Blue or black species, often with creamy or white markings. (Scutellum triangular, only reaching the base of the membrane).

S. bicolor, L.—Blue-black; corium white at base and apex, pronotum in front with two white lateral spots. (Tibiae largely white). Parley Heath (Dale); Fleet, larvae on *Stachys sylvatica* (Butler). I have specimens from either Lymington or N. Forest. I. of Wight: Marvel Copse (Morey). Found on nettles—often by roadsides—or similar low vegetation.

S. dubius, Scop.—Purplish-black, sides of pronotum and corium only margined (narrowly) with white. Sandown and Freshwater, I. of Wight (Champion). Evidently local, but almost certain to occur on mainland. According to Butler (B.Br.H.-H.) it has been taken most often amongst fine grass.

S. biguttatus, L.—Black; corium with only a small white central spot. Lyndhurst, 1909 (C. Morley). Not uncommon in N. Forest amongst moss under heath (*Calluna*), etc. I. of Wight: Combley Wood, Aug., 1907 (F. Morey).

S. luctuosus, M. & R. (*morio*, L.).—All black, with an aeneous reflection. On ground at roots of plants in sandy, or chalky localities. Bournemouth (Dale). I. of Wight (Butler and Morey).

Gnathoconus, Fieb.—Allied to *Sehirus*, but has transverse eyes. Oval, black, sides of elytra narrowly whitish.

G. albomarginatus, F.—Central lobe of head extending as far as cheeks. Occurs generally, and in a variety of situations. Very common in I. of Wight.

G. picipes, Fall.—Central lobe of head shorter than cheeks. Sandown, I. of Wight (Champion). Said to be associated with violets.

Sub-Fam. 4. PENTATOMINA.—Pal. 300, Br. 14. Legs not strongly spinose. Rostrum long and slender; tarsi 3-jointed. The 12 genera, comprising a somewhat mixed assemblage, may be grouped in order as follows:

I. L. 4-9mm. Mainly pale coloured, very robust bugs of rather varied form, particularly as regards the head, which is large—almost disproportionately so—and provides good distinguishing characters. Ochreous, or greenish ochreous, often with darker markings (formed chiefly by the conglomeration in certain parts of strong black punctures). Habitat usually on ground or amongst low plants.

Sciocoris—*Peribalus*.

II. Larger species. L. 12-14mm. Broad, more or less shield-shaped, in some instances with the posterior angles of pronotum very strongly and acutely produced. Head not large in proportion. Green or brown, or with the two colours combined; surface dull or slightly bronzy. On trees and bushes.

Carpocoris—*Pentatoma*.

III. Short, sub-triangular L. 6-7mm. Vividly coloured (e.g., scarlet) shiny, spotted species, with the head margins raised, and the orifices to scent-glands only indistinctly shown.

Eurydema.

Sciocoris, Fall., *S. cursitans*, F.—Margins of head and pronotum thin and foliaceous; head very large, about as long as wide, sub-triangular; elytra short, not covering abdomen, which is almost circular in outline, the connexivum very flat, dilated, and spotted. Pale ochreous, dull, marked with black. L. 4½-6mm. Bembridge, I. of Wight, 6.iv.20 (Fowler: Nottm. Mus. Coll.). Possesses a liking for rough stoney ground overgrown with *Sedum* and *Teucrium*, from the last of which of least it has been "swept."

Aelia, F., *A. acuminata*, F.—("Bishop's Mitre"). Head and pronotum forming a triangle, the head long, and very pointed, and as seen from the sides arched downwards. The elytra also form a reversed triangle, so that the insect is diamond-shaped. Pale brown, striped longitudinally with dark colour. L. 8-9mm. A very quaint and pretty species, recognisable at a glance. On ground, usually amongst long dry grass. Winchester (Forbes); Fleet, Aug. '03 (E. A. Butler). Generally distributed and rather common in I. of Wight.

Neotiglossa, Hhn., *N. pusilla*, Gml.—Head short, sub-triangular, and much bent downwards in front. Sides of elytra sub-parallel. Small, ochreous and shiny with black punctures. N. Forest

(Champion). Hengistbury Head, near Christchurch, July, 1922, several on honeysuckle (H. R. P. Collett). I. of Wight: Parkhurst Forest (C. Morley, F. Morey).

Eusarcoris, Hhn.—Very short, stout, shield-shaped species, of a pale greenish bronzy colour. Head prominent, almost square in outline, dark bronzy.

E. melanocephalus, F.—Scutellum with a dark-metallic basal patch. New Forest (T. B. Wells). Crookham, Aug. '03 (E. A. Butler). On *Stachys sylvatica*.

E. acutus, Scop.—Scutellum without dark patches, but with two lateral white callosities (Pronotal sides more sinuate, the hinder angles much produced) New Forest, by "general sweeping" (J. J. Walker and others); I. of Wight: Parkhurst Forest, 10.ix.07. (F. Morey).

[*Peribalus*, M.R., *P. vernalis*, Wlff.—Larger, longer, and less robust than *Eusarcoris*, more resembling certain of the species following. Head long, with the sides curving regularly to slight point in front; posterior angles of pronotum somewhat lobately produced. Dark ochreous. On hazel, poplar, etc. Very rare.]

[*Carpocoris*, Klt., *C. fuscispina*, Boh.—Yellowish ochreous, tinged with red, particularly about head, the margins of which however are black. Posterior angles of pronotum acutely produced; connexivum spotted with black. Rare; on *Umbelliferae*, *Centaurea*, etc.]

Dolycoris, M.R., *D. baccarum*, L.—("Sloe-bug") Darker with often a purplish tinge; pilose; hind angles of pronotum simple; connexivum spotted black. New Forest (J. J. Walker and others); Southampton and Lymington. (H. P. Jones). Probably of fairly general occurrence I. of Wight: Sandown (Champion); Parkhurst Forest (F. Morey). On various low plants and shrubs, such as *Prunus*.

Palomena, M.R., *P. prasina*, L.—Entirely pale green. A rather flat broad species, L. 13-14mm. Generally distributed in S. Hants at least. I. of Wight: Parkhurst Forest and Combley Wood (E. A. Butler: "N.H.I. of W."). On birch, raspberry, and many other trees and shrubs. Adults are most easily found in the spring after hibernation.

[*Chlorochroa*, Stål., *C. juniperina*, L.—Convex, olive green, lateral margins of pronotum narrowly raised and ochreous. L. 12-13mm. Not very likely to occur in Hants. Confined to juniper.]

Piezodorus, Fieb., *P. lituratus*, F.—Narrower, smaller (10-13mm.) than *chlorochroa*; dull olive green, often with the elytra and extreme base of pronotum purplish or reddish. 2nd ventral segment with a long spine. On or about gorse; usually common.

Pentatoma, Ol., *P. rufipes*, L.—("Shield-bug" or "Forest-bug"). Reddish brown, bronzy, scutellum red-tipped; 2nd ventral segment with a very small tubercle. Side angle of pronotum largely produced forwards before curving back to a point. In woods on hawthorn, oak, etc. Throughout the county, and often extremely abundant.

Eurydema, Lap.—Shiny, glabrous, gaily coloured variegated species with the head margins raised.

E. dominulus, Scop.—Bright red, with black markings. Alton, on a gooseberry bush in an old garden (E. A. Butler). Rare; said to frequent *Cruciferae* and *Umbelliferae* and has been swept from *Mentha hirsuta*.

E. oleraceum, L.—Dark green, with ochreous, or reddish markings.

Butler (B.Br.H.-H.) gives "Hants," with reference probably to I. of Wight, where it has been taken by Lewis (N.H.I. of W.). On *Cruciferae* and other low plants—e.g., *Pimpinella saxifraga*. Rare.

Sub-Fam. 5. ASOPIDINA.—5 Br. (Pal, 300?) Rostrum stout. In general appearance and size much like the *Pentatomina*.

Picromerus, A.S., *P. bidens*, L.—Posterior angles of pronotum much produced and spine-like. Front femora toothed beneath. New Forest, not uncommon, and probably well spread in Hants. I have, however, no certain record for the I. of Wight. On *Myrica gale*, and many other plants.

Rhacognathus, Fieb., *R. punctatus*, L.—Pronotal angles only slightly prominent; legs banded. Brownish, with a green or purplish tinge, especially on head. Southampton (Champion); Bournemouth (Dale); N. Forest, rarely, by beating oaks (J. J. Walker). On ground perhaps mainly, amongst low plants—e.g., *Erica*. I. of Wight?

Troilus, Stål. (*Podisus*, id.O.C.), *T. luridus*, F.—Angles of pronotum produced into rounded processes; 2nd abdominal segment with a sharp basal process. Ochreous, with green reflections; pronotum in front and head normally green. (Abdomen above, under elytra, deep purple). Common, particularly in the larval stage, on various trees and bushes. The larvae are highly metallic, and probably carnivorous to a great extent.

[*Jalla*, Hbn., *J. dumosa*, L.—Front femora toothed as in *Picromerus*, but hinder angles of pronotum simple; rostrum very stout. Rare, frequenting dry sandy and stoney places. Largely carnivorous.]

Zicrona, A.J., *Z. caerulea*, L.—Entire insect brilliant metallic blue, or greenish blue. Fairly common in the New Forest in some seasons. I. of Wight: Ventnor (Saunders); Sandown (Champion). On various plants, usually in dry heathy situations. I have more than once beaten it from hawthorn blossom. (Brockenhurst.)

Sub-Fam. 6. ACANTHOSOMINA.—Pal. 34, Br. 5. Of similar size to *Asopidina*, but longer, and more angular; tarsi with only two joints. Rather gracefully shaped bugs, prettily coloured green, bronze, and rose.

Acanthosoma, Curt.—Antennae long, basal joint projecting far beyond head; connexivum unspotted.

A. haemorrhoidale, L.—Large species, 13-15mm. Angles of pronotum very strongly and acutely produced. Ochreous or greenish, red-tinged. Generally distributed, and often very common. Frequents hawthorn usually, but has been noticed by Collett in Hants (Tiptoe) on willow.

A. interstinctum, L. (= *Elasmostethus interstinctus*, O.C.)—Smaller, but rather similarly coloured to the last; angles of pronotum strongly but not sharply produced. L. 8-10mm. [This is, of course, the *H. dentatum* of Saunder's H.-H.Br.Is.] New Forest, fairly common. I. of Wight: Yarmouth (near) one nymph, 3.ix.23. (J. M. Brown). On birch.

Elasmostethus, Fieb. (*Clinocoris*, id, O.C.), *E. griseus*, L.—[*A.(E.) interstinctum* of H.-H.Br.Is.]. Antennae comparatively rather short, but with the 1st joint projecting considerably beyond head. Stouter species, with the connexivum spotted and not hidden by elytra, and orifice of odoriferous sac short. Pronotal angles produced. On birch, not uncommon. N. Forest and Lord's Wood (H. P. Jones);

Southampton 17.vi.27. (S. A. Jones *teste* H.P.J.). I. of Wight: Marvel Copse (Morey).

[*A. (E.) ferrugatus*, F.—Of similar size to the last species, but with the posterior angles of pronotum very strongly and acutely produced—even more so than in the large *A. haemorrhoidale*. Very rare; last taken near Derby (E.M.M. xl. p. 38.).]

[*Cyphostethus*, Fieb.—1st joint of antenna not reaching or scarcely reaching beyond apex of head. Head and antennae long. The only British representative is *C. tristatus*, F., which occurs very locally in this country on juniper. Green, with the clavus and corium inwardly red; pronotal angles simple, tinged with red.]

In all the following families except *Aradidae* the scutellum is comparatively very short, never encroaching on the membrane. The general form, too, is quite different.

Fam. 2. **Coreidae**.—More or less elongate (*e.g.*, violin-shaped), often spinous, strongly built insects, with antennae of a much stouter structure than in all our other Heteroptera except the otherwise very distinct *Aradidae*. Proboscis sheath 4-jointed; ocelli present; antennae 4-jointed, and inserted far up on the sides of the head; apical antennal joint frequently swollen, but femora not knobbed at tip. Surface and colour (brownish) dull. Pal. 170, Br. 21.

[*Larva*. Body longer than broad; tarsal joints variable. Often spinous like the adult, and with similarly long and thick antennae.]

Sub-Fam. 1. **COREINA**.—Apical antennal joint short.

Spathocera, Stein., *S. dalmani*, Schill.—Pronotum very long, almost as long as wide; apical antennal joint much swollen. L. 5-6 mm. In dry sandy places on the ground. Rare.]

Enoplops, A.S. (*Coreus*, id, O.C.), *E. scapha*, F.—Violin-shaped, having the posterior angles of pronotum produced considerably and the connexivum widely dilated. Antenniferous tubercles with strong external spines. L. 11-12mm. Common along coast in I. of Wight, frequenting the ground in dry places, and no doubt also occurs on the mainland.

Syromastes, Ltr., *S. marginatus*, L.—Violin shaped, but with the pronotal angles even more produced, so that the pronotum is almost as wide across as the dilated abdomen. Ant. tubercles simple; head between antennae with two spines. Bishopstoke, 9.v.28 (Killington *teste* H.P.J.). I. of Wight: various localities. Amongst low plants.

Verlusia, Spin., *V. quadrata*, F. (*V. rhombea*, L., id, O.C.)—Connexivum strongly and angularly dilated in middle causing the abdomen to appear diamond-shaped. Pronotal angles produced. Bournemouth district and N. Forest, not uncommon. Bishopstoke, 28.viii.26 (Killington). I. of Wight: many localities.

[*Gonocerus*, Ltr., *G. acuteangulatus*, Gze.—Angles of pronotum strongly and sharply produced, but sides of abdomen sub-parallel. On box-trees, where it occurs.]

[*Pseudophloeus*, Brm.—Margins of pronotum rugose, and more or less spinose; connexivum dilated and spotted. L. 7 mm. There are two British species, one of which *P. fallenii*, Seb., may occur in Hants. It usually frequents sand-dunes, seeming to be most often observed in S. Wales, although it has occurred in Surrey and elsewhere. The

rarer *P. waltlii*, H.S., has so far been noticed only in E. Anglia. Unlike *fallenii* it has the antennary tubercles pointed, the 3rd antennal joint widened and black at the apex, and the scutellum carinated only at the apex. It is also slightly larger and darker.]

[*Bathysolen*, Fieb., *B. nubilus*, Fall.—Antennae swollen at tip; sides of pronotum straight (narrowing to head), and simple. Abdomen not dilated posteriorly. Only three or four Br. examples are known.]

[*Ceraleptus*, Costa., *C. lividus*, Stein.—Sides of pronotum straight, denticulate in front; 1st and 2nd antennal joints sub-equal; posterior femora spined and black at apex. Connexivum dilated. Mainly in moss on sand-hills; local, but very probably occurs in Hants.]

Coreus, F. (*Coriomoris* id. O.C.), *C. denticulatus*, Scop.—In shape not unlike *Ceraleptus*, but hairy throughout, and with long pale spines on the sides of the rugose pronotum. Bournemouth (Dale); N. Forest (Butler); I. of Wight: Sandown (Morey). On ground in dry places.

Sub-Fam. 2. ALYDINA.—Apical antennal joint very long and curved; antennae not very thick. Head large, broad; eyes prominent.

Alydus, F., *A. calcaratus*, L.—A long-legged, black, narrowly formed bug; the hind femora very long, and spined beneath at apex. L. 12mm. Locally common in New Forest, where it frequents sand banks or the edges of paths (such as the tracks across Beaulieu Heath) where a short dense growth of gorse is abundant, seldom venturing far from the shelter of the last in dull weather in my experience, although it is very active, and will fly readily in hot sunshine. Parley Heath and Bournemouth (Dale). Probably occurs on suitable ground throughout the county. I. of Wight: Niton (Donisthorpe); St. Georges Down, 5.ix.28 (J. M. Brown). Associated with ants, which the larvae considerably resemble. It seems especially common where *Tetramorium caespitum*, L. abounds, but this is probably a mere coincidence, the more usual hosts apparently being the large *Formica* spp.* Donisthorpe (cf. B.Br.H.-H.) has taken it with *F. fusca*, Ltr., in the New Forest and I. of Wight, as also with *Acanthomyops niger*, L., in the last locality, where the bug was found in all its stages (Niton).

Sub-Fam. 3. STENOCEPHALINA.—Antennae much as in *Alydina*. Species dark, dull ochreous, and narrowly pear-shaped, the body much the widest posteriorly; Head small and narrow, parallel sided behind eyes; connexivum dilated, spotted yellow; legs and antennae hairy, ringed with yellow and black; posterior femora simple.

Stenocephalus, Ltr., *S. agilis*, Scop.—2nd antennal joint with dark ring near base; femora with long, but not erect hairs. L. 12-13mm. On littoral *Euphorbiae*. I. of Wight: Sandown (Butler); Culver Cliff, several on or near *Euphorbiae* (J. M. Brown).

S. albipes, F.—2nd antennal joint without a dark basal ring; femora with long hairs which are erect. Smaller. L. 10-11mm. On *Euphorbiae*, not necessarily near the sea. New Forest (J. C. Dale). A very old, and possibly incorrect record. No recent British captures are known.

[*S. medius*, M.R.—Legs with short hairs; rostrum longer, reaching

* Since this was written the same writer's "The Guests of Br. Ants" (Routledge) has appeared, in which the habits of *Alydus* and other Br. Myrmecophilous Hemiptera are fully discussed.

to posterior instead of intermediate coxae, as in the two preceding species. L.8-10mm. Rare; has only occurred inland in Britain. Butler (B.Br.H.H.) once found a nymph in Berks amongst long grass (Maidenhead Thicket, S.viii.93). On the Continent it is reported to occur on oak !]

Sub-Fam. 4. CORIZINA.—Unlike all the preceding has the scent-gland indistinct or hidden. Surface dull, but colours often bright; head broad, short, with prominent eyes; body scarcely wider behind.

Therapha, A.S., *T. hyoscami*, L.—Corium opaque, bright red, spotted with black. On *Ononis*. I. of Wight (Marshall).

Corizus, Fall. Corium more or less transparent in parts; membrane hyaline, the body markings showing through; head large, with very prominent eyes. Ochreous, often with a reddish tinge. In all but the first species (which should be separated) the hind angles of the metapleurae are sinuate, and their external angles somewhat produced.

C. (Stictopleurus, id, O.C.) crassicornis, L.—Dull brown, hind margins of metapleurae not sinuate, their exterior angles simply rounded. Only var. *arbutilon* has occurred in Br. Bournemouth, on *Psamma* (Douglas).

C. maculatus, Fieb.—Orange yellow, abdomen yellow above on disc with black markings. N. Forest (Dale, Morley, Butler and others). In damp places, e.g., Matley Bog where Morley has taken it on Skull-cap (*Scutellaria*) and Butler by searching at the roots of the large grass *Poa nemoralis*. Boldre, swept from *Myrica*, etc. (H.P.J.); Parley Heath (Dale).

C. subrufus, Gml.—Reddish brown with darker and paler markings: disc of abdomen (as easily seen through membrane) black with pale markings: connexivum with black spots: tibiae with narrow brown rings. Bishopstoke, 28.viii.26 (Killington teste H.P.J.); Alice Holt, Aug. '99 (Rowledge): Parley Heath (Dale). Not rare; the food plant is apparently St. John's Wort (*Hypericum perforatum*).

In the two following closely allied species the colouring of the abdomen is similar to that in *subrufus*; the connexivum, however, is at the most slightly spotted, and the tibiae are without definite rings. Some of the differences are perhaps not very stable.

C. parumpunctatus, Schill.—Reddish-grey, with black spot on throat under rostrum; genital styles blunt and thick (connexivum always spotted in ♂?). Bournemouth by roadsides; abundant (Saunders). In the same locality by sweeping Marram grass (Douglas). Parley Heath (Dale); N. Forest (Champion).

C. rufus, Schill.—More red; connexivum and throat unspotted; genital styles more slender, and awl-shaped. Recorded with any certainty only from Fleet (E. A. Butler). Possibly other Hants specimens exist in colls. but under the name *parumpunctatus*.

[*C. (Liorhyssus, id. O.C.) hyalinus*, F.—Has occurred twice in Britain. It has, among other differences, an unusually long and hyaline membrane, a long apical antennal joint, and a smooth and unpunctured "collar" to the pronotum].

Myrmus, Hbn., *M. miriformis*, Fall.—Long, flat, green, or greenish, with a reddish line down back in undeveloped form at least, and reddish legs. Legs and head rough and hairy; head large. Elytra often un-

developed. L. 7-9mm. New Forest, and S. Hants fairly generally (including I. of W.). By sweeping grass on heaths.

[*Chorosoma*, Curtis, *C. schillingi*, Schml.—Large, 15-16mm. Pale ochreous, very elongate, linear, and flattened, approximating in shape and tint to the spikelets of the marram grass (*Psamma*) on which the insect lives. Habitat: sand-dunes.]

Fam. 3. **Berytidae**.—(Stilt-bugs) Pal. 33, Br. 8. Remarkably narrow and delicate bugs—smaller than the last species. L. 4-11mm. Legs and antennae very long and thin, with the apical antennal joint, and apex of the first, much swollen, and apex of femora very clavate. Pronotum keeled longitudinally at middle and sides. Larva green, but otherwise very similar.

Sub-Fam. 1. BERYTINA.—Head long, and as seen from above, with a more or less acute frontal process. Like dried grass bents in form and colour, and found usually amongst grass or hibernating in moss, etc.

Neides, Ltr., *N. tipularius*, L.—Hind femora reaching nearly to apex of membrane; 2nd antennal joint long. L. 10-11mm. N. Forest (P. Harwood); Parley Heath (Dale). I. of Wight: St. George's Down (Butler). Amongst Rest-Harrow (*Ononis*), dried grass bents, and (hibernating) in moss.

Berytus, F.—Posterior femora not nearly reaching to apex of membrane; 2nd antennal joint very short. Smaller than *Neides*.

B. clavipes, F.—Frontal process of head twice as long as its basal width, and very sharply pointed. I. of Wight: Niton (Marshall).

B. minor, H.S.—Club of 1st antennal joint black; apex of femora pale. Larger, narrower than the last, elytra much longer. Lyndhurst, N.F. (C. Morley); Setley, nr. Lymington (H.P.J.). Hurn (Harwood). I. of Wight: Pandown, Shide (E. A. Butler); Alverstoke and Shanklin (J. M. Brown). At roots of grasses in heathy situations.

[*B. signoreti*, Fieb.—Frontal process triangular, not twice as long as its basal width.]

B. montivagus, Mey.—Frontal process more or less blunt (as viewed from above). Larger, femora more slender, and less clavate than in *signoreti*. I. of Wight: Ventnor (Saunders).

B. crassipes, H.S.—Apex of femora black; club of 1st antennal joint black. L. 4-5mm. "Hants" (B.Br.H.-H.); Bournemouth (Saunders). Probably, with most of its allies, fairly common in Hants, but overlooked.

Sub-Fam. 2. METACANTHINA.—Head simple in front, shorter and broader than in *Berytina*. Legs very long and fine and speckled with black. Resemble *Nemocera* (Diptera).

Metatropis, Fieb., *M. rufescens*, H.S.—Scutellum simple; membrane very large; abdomen brownish. L. 9-10mm. Rather common in N. Forest on or about its food plant, *Circaea lutetiana*. It is fond of hawthorn blossom, and may be swept from bracken, etc. It takes to wing readily when, as remarked by Com. J. J. Walker, it bears a strong resemblance to one of the small light-coloured *Tipulidae* (Crane Flies) of the genus *Limmobia*.

Metacanthus, Cost., *M. elegans*, Curt. (*M. punctipes*, O.C.)—Scutellum with a long curved spine; membrane shorter. Considerably smaller (4-5mm), paler, and even more delicate looking than *Metatropis*. On or under *Ononis spinosa* growing in sandy places. Hayling Is. (Butler);

Milford (H.P.J.). I. of Wight: Sandown, on *Ononis*, but only where soil is sandy (Butler).

Fam. 4. **Lygaeidae** (*Mydochidae*).—Includes genera of somewhat diverse facies, difficult to define as a whole. Elytra composed of clavus, corium, and membrane, as in the preceding families, to which, however, the group in the main bears little or no resemblance. Pronotum generally subquadrate, impressed transversely or along lateral margins. Head usually short, without an obvious "neck," often appearing sunk in pronotum, the eyes almost or quite touching the last, and frequently slightly embraced by the anterior angles. Antennae not very stout or long, situated just below an imaginary line drawn along side of face from centre of eye to apex of head. Size mainly small or very small, body longer than broad, usually narrowly oval; anterior femora often much thickened, and spined or toothed beneath. Most of the species occur on the ground, and are therefore obscurely coloured—black, varied with brown, or entirely ochreous—never green.

[*Larva*.—Longer than broad, and characterised chiefly by the pronotal impressions.]

Sub-Fam. 1. **LYGAEINA**.—All the abdominal stigmata situated on connexivum. Pal. 63, Br. 3.

[*Lygaeus*, F., *L. equestris*, L.—Bright red, with black markings; antennary tubercles rounded. L. 10mm. Not unlike *Therapha* spp., but membrane with round white spot.]

Nysius, Dall.—Narrow, greyish ochreous; ant. tubercles angular. Elytra sides parallel; eyes projecting much beyond anterior angles of pronotum. (This genus could only be confounded with *Henestaris*.)

N. lineatus, Cost.—Scutellum with a pale central keel. L. 4-5mm. Bournemouth (Dale); "Hants" (B.Br. H.H.). On heaths; uncommon.

[*N. thymi*, Wlff.—Scutellum without a definite keel. L. 4mm. In sandy, heathy places, amongst stunted vegetation. Usually considered rather common, but I am unable to obtain a Hants record.]

Sub-Fam. 2. **CYMINA**.—Abd. stigmata as in *Lygaeina*, but elytra deeply punctured. Legs short.

Cymus, Hhn.—Sub-elongate, sides of elytra rounded; ant. tubercles prominent. Ochreous, legs very short, posterior pair not nearly reaching to apex of elytra.

C. glandicolor, Hhn.—Scutellum with a strongly raised central keel; dorsal keel of pronotum elongate. L. 4mm. By sweeping in damp places. N. Forest, rather common. Hengistbury Head (Collett). I. of Wight: Parkhurst Forest (Butler). Alverstoke and Shanklin (Brown).

[*C. obliquus*, Hrv.—May occur in Hants. Resembles *glandicolor* in having a distinct pale carina to scutellum, but is smaller and less elongate.]

C. melanocephalus, Fieb.—Scutellum without a keel; dorsal carina of pronotum short. Smaller, usually much darker, clavus irregularly punctured. Boldre, N. Forest, and Lymington (H.P.J.). I. of Wight? By sweeping rushes, etc.

C. clariculus, Fall.—Two more or less distinct parallel lines of punctures along claval suture; rest of corium irregularly punctured. L. 3mm. (Paler species; scutellum slightly keeled). Well distributed,

S. Hants. Morley records it as common at Mark Ash, N. Forest, 1927, on *Persicaria*. Gurnard, I. of W. (Morey).

Ischnorhyncus, Fieb.—Sub-rotundate; ant. tubercles small, unseen from above. Species normally separable by their habitat alone.

I. resedae, Pz.—L. 5mm. Reddish brown; occurs on various trees (e.g. birch) and shrubs, N. Forest; Wood Fildley, etc. (H.P.J.) I. of Wight; Bonchurch (Dale).

I. geminatus, Fieb. (*I. ericae*, Hrv., O.C.).—Smaller, paler. L. 3½mm. On or about heath. Often very common in N. Forest, frequenting both *Calluna* and *Erica*. I. of Wight: several localities.

Sub-Fam. 3. BLISSINA.—Stigmata of 6th abd. segment ventral.

Ischnodemus, Fieb., *I. sabuleti*, Fall.—L. 4-4½mm. Long, flat, parallel sided. Black, with close greyish pubescence; elytra pale, seldom developed. Scarce.]

Sub-Fam. 4. HENESTARINA.—Stigmata of 5th and 6th abd. segments ventral; eyes markedly pedicellate, head short. Narrow ochreous.

Henestaris, Spin., *H. laticeps*, Curt.—Eyes on very long pedicels, projected slightly away from pronotal angles, and reaching far beyond them. Littoral. Milford, Sept., 1920 (H.P.J.). Yarmouth, I. of W., in Saltmarsh (Butler). Occurs on the ground, often at the extreme edge of cliffs.

[*H. halophilus*, Brm.—Very similar, but eyes much less produced on wider pedicels, and almost touching pronotum. Local.]

Sub-Fam. 5. ARTHENEINA.—Stigmata of at least the last three abd. segments ventral; cheeks of face scarcely shorter than central lobe.

[*Chilacis*, Fieb., *C. typhae*, Perris.—Ochreous, almost regularly elliptic; lateral margins of pronotum foliaceous, and slightly sinuate. (Pronotal angles receiving eyes.) In heads of *Typha latifolia*. No doubt occurs in Hants, but difficult from its habits to secure.]

Sub-Fam. 6. HETEROGASTRINA.—Cheeks much shorter than central lobe; stigmata of last three abd. segments ventral; membrane with two distinct basal cells. (Bronzy, with paler markings; front femora thickened, with a tooth—*Heterogaster*.)

Heterogaster, Schill., *H. urticae*, F.—Head and pronotum with long erect hairs; tibiae with three black bands. On nettles, etc., and not rare. N. Forest and Hayling Is. (Billups). I. of Wight: Newport (Newberry); Parkhurst Forest (Butler).

H. artemisiae, Schill.—Head and pronotum without long erect hairs; tibiae with only base and apex black. By sweeping, but apparently has no especial association with *Artemisia*. Hayling Is. (Billups).

Sub-Fam. 7. APHANINA.—Membrane without basal cells; cheeks much shorter than central lobe. Front femora often incrassated, and toothed beneath.

Pamera, Schill.—Pronotum constricted strongly just behind the middle; front femora with teeth, and incrassate. Black and brown, legs pale. (Eyes set well away from pronotal angles).

P. fracticollis, Schill.—Sides of pronotum only slightly rounded in front of constriction, without pubescence. N. Forest, fairly common (Fowler, Butler, and others). By sweeping in marshy places. I. of W.?

P. lurida, Hhn.—Sides of pronotum in front much rounded, with

fine erect pubescence. N. Forest (Saunders, Thornley). In *Sphagnum*.

Rhyparochromus, Curt.—Pronotum very broad in front, black, slightly constricted near base. Front femora incrassate, with a strong tooth, or group of smaller spines. Black, varied with brown. L. 4-5mm. In moss, grass, dried leaves, etc.

R. antennatus, Sebill.—Shiny, legs all yellow (front femora with a very large tooth). I. of Wight: Sandown, at roots of plants (*Champion*); Haven St. (Morley).

[*R. praetextatus*, H.S.—Very shiny; legs yellow, femora of front pair coal black. Elytra largely pale yellow. Hants?]

R. dilatatus, H.S.—Dull, without long hairs; legs and antennae generally black. Parley Heath (Dale); Stoneham (Douglas and Scott). I. of Wight: Sandown (Champion).

R. chiragra, F.—Dull, with long hairs; tibiae and 2nd antennal joint usually pale. N. Forest, not uncommon: Lymington (H.P.J.).

[A variable species. In var. *nigricornis* (scarce) the antennae are entirely black. The littoral v *sabulicola*, Thoms., has all the tibiae pale ochreous, the 2nd and 3rd ant. joints pale, and the pronotum less strongly punctured at the base. I have no definite Hants record for either of these two forms, but probably the last mentioned occurs on the coast.]

Tropistethus, Fieb. *T. holosericeus*, Schltz.—Not unlike *Rhyparochromus* spp. but very small (2mm.) with two longer teeth on anterior femora, following on which teeth to the apex of femora are numerous smaller spines. (Tibiae glabrous). At roots of grass, in moss, etc., usually in chalky places. Ventnor, I. of W. (Douglas and Scott).

Ischnocoris, Fieb. *I. angustulus*, Boh.—Sub-elongate; eyes very large, the distance between them hardly so wide as their combined width; anterior femora not toothed. Pronotum dull, base widely ochreous; membrane dark. L. 2½mm. Common, but usually undeveloped. On ground in heathy places.

Macrodera, Fieb. *M. micropterum*, Curt.—With much smaller eyes, but rather like the last in developed form, which seems however very rare in Br. Pronotum polished, only narrowly pale at base, and membrane with pale spots. In the more familiar micropterous form the insect superficially resembles a small, glossy, black-bodied Staphylinid beetle (abbreviated wings pale). L. 2½-3mm. Extremely common, running on heaths in July and August. The macropterous form has so far as I know only been taken in Hants at Bournemouth (Douglas) in September.

[*Pionosomus*, Fieb. *P. varius*, Wlff.—Sub-oval, bronzy, clothed with erect hairs; elytra with pale ochreous spots. L. 2mm. This very distinct and active little species is very local in Britain. On sandhills, where it has occurred between Deal and Sandwich and in Jersey.]

Plinthisus, Fieb. *P. brevipennis*, Ltr.—Flat, glabrous, shiny; blackish brown, pronotum broad with sides rounded near anterior angles (cupping the head) then nearly straight; anterior femora incrassated, with two small spines beneath. L. 2½-3mm. Pterygodimorphous; the rare macropterous form is the *P. bidentulus* of H. Schaeffer. N. Forest, as at Setley (H.P.J.) and Matley Bog (Morley).

I. of Wight: Ventnor (Douglas); Pan Down (Butler); Sandown and Lake (Brown).

Lasiosomus, Fieb. *L. enervis*, H. Schff.—Very shiny, with rather long hairs; membrane hyaline; pronotum trapeziform, black, widely yellow behind; central lobe of face, and all but apical antennal joint, yellow; legs simple, yellow. L. $3\frac{1}{2}$ mm. Mudeford, on bank overlooking shore sandhills (Collett). I. of Wight: Culver Cliff, at roots of coarse grass, rather common (Bedwell); Sandown, one example, July, 1920, *teste* Butler (Jas. M. Brown). Very distinct, but liable to be confused at first sight with the very common *Stygnocoris pedestris*.

Acompus, Fieb. *A. rufipes*, Wlff.—Glabrous, rather dull; eyes very prominent, projecting beyond pronotum, which is trapeziform, and like the head entirely black. Antennae and legs coloured much as in *L. enervis*; anterior femora simple; elytra pale. L. 4mm. N. Forest (Champion). On ground, usually in very swampy situations.

Stygnocoris, D.S.—Eyes projecting beyond pronotum. Surface dull, finely hairy; anterior femora beneath with a series of fine hairs or spine-like bristles. Black and brown. 2-4mm.

S. rusticus, Fall.—Pronotum black or brown, not paler behind. Well distributed. N. Forest; Parley Heath (Dale); Hayling Is. (Billups). I. of Wight: Carisbrooke (Newberry), and other localities. By sweeping flowers, etc. Macropterous form infrequent.

S. pedestris, Fall.—Pronotum pale posteriorly; legs yellow throughout. Common. In moss, grass, dead leaves, by sweeping, etc.

S. fuliginus, Geoff. (*arenarius*, Hahn., H.-H.Br.Is.).—Pronotum pale behind, femora of legs brown. Common with the foregoing on both mainland and I. of W.

Peritrechus, Fieb.—Head and thorax much longer; eyes large, more or less projecting; anterior femora with one or two fine spines. Black, varied with ochreous; glabrous, surface very dull. L. 4-5mm.

P. geniculatus, Hhn.—Tibiae more or less dark; antennae thicker; eyes very prominent; pronotum less transverse, $\frac{3}{4}$ as long as wide. Amongst dead leaves, in moss, grass, etc. Not uncommon. N. Forest; Lymington; Bournemouth and Parley Heath (Dale). I. of Wight: Yarmouth (Morley); Luccombe (Butler); Culver Headland, "v. com. indeed" (J. M. Brown).

P. gracilicornis, Put.—Antennae thinner; tibiae entirely (?) pale; eyes prominent. Paler, more slender. Shide, I. of W., by sweeping on the Downs (Butler).

P. nubilus, Fall.—Tibiae as in *geniculatus*, but eyes less prominent (space between wider), antennae thinner (or shorter?) and pronotum strongly transverse. It is difficult to imagine that this species at least is anything more than a race of *P. geniculatus*. "Hants" (Butler: B.Br.H.-H.).

P. sylvestris, F. (*luniger*, Schill.).—Membrane with a distinct white apical spot; front femur with only one spine; 2nd antennal joint yellow at base. Very common; by sweeping, etc.

Trapezonotus, Fieb.—Flatter, wider species, similarly coloured, but with narrow, pale, foliaceous lateral margins to pronotum. Front femora with two spines, and legs usually with bristly hairs.

T. distinguendus, Flor.—Legs without bristly hairs. L. $3\frac{1}{2}$ -4mm. Ventnor, I. of W. (Lewis). Very local.

T. arenarius, L. (*agrestis*, Fall.).—Tibiae spiny; basal joint of front tarsi only slightly longer than the other two combined. L. 3-5mm. Common. Butler mentions taking a large and very dark var. on heathy ground at Hawley.

[*T. dispar*, Stål.—Large. L. 5mm. Paler than *arenarius*, 3rd joint of antenna proportionately longer; foliaceous margin rather broader, and membrane paler; black patch at apex of oorium much smaller. Scarce, but possibly often confused with *T. arenarius*.]

[*T. ullrichi*, Fieb.—Basal joint of hind tarsi nearly twice as long as the other two together. L. 6mm. Very rare. Littoral?]

[*Calyptonotus*, D.S., *C. rolandri*, L.—Basal joint of hind tarsi twice as long as the other two together. Entirely dull black except for an orange patch at base of membrane; clavus irregularly punctured. Unrecorded for Hants, but occurs in Dorset (Portland)].

Aphanus, F.—Basal joint of posterior tarsi as in *Calyptonotus*. Species all more or less ochreous, pronotum black only in front. Tibiae bristly; anterior femora spined beneath.

A. (subg. *Graptopeltus*, Stål.) *lynceus*, F.—With two external parallel rows of punctures on clavus; pronotal angles receiving eyes; scutellum with a pale V-shaped apical mark. Sides of pronotum entirely pale; membrane black. Wider, larger, and darker. L. 6-6½ mm. N. Forest (Champion); in the same locality at Mark Ash, 1927 (Morley). I. of Wight (Pascoe). Not common, found most frequently on sand hills according to Butler (B.Br.H.-H.).

[*A.* (subg. *Xanthochilus*, Stål.) *quadratus*, F.—Much paler, narrower and smaller. L. $4\frac{1}{2}$ -5mm. With two divergent rows of claval punctures; sides of pronotum entirely pale ochreous, the pale area very sharply defined; membrane only dark in centre. Rare. Dorset (Swanage) and Devon.]

A. alboacuminatus, Gze. (*pedestris*, H.-S.).—Clavus punctured as in *quadratus*, but pronotum only pale at base, and posterior angles black; hind femora dentate at apex. Bright ferruginous, with black and white markings; legs and antennae largely testaceous. L. 5-6mm. Local.]

A. pini, L.—Claval punctures divergent, and pronotum only pale posteriorly; membrane dark, legs and antennae black, hind femora simple. About the size and shape of *A.* (*G.*) *lynceus*, but browner, narrower, pronotal angles not embracing eyes. N. Forest (Champion); Fleet, commonly, by sweeping long grasses (Butler); Bournemouth (Dale).

Beosus, A.S., *B. maritimus*, Scop.—With characters of *Aphanus*, but narrower, head longer, the eyes larger and more prominent (produced beyond pronotum). Antennae black, ringed with yellow; pronotum yellow behind, but with the posterior angles black (antennae and legs long). L. 6-6½mm. Parley Heath (Dale); ? a nymph which failed to mature at Milford, June 27th, 1926, on *Silene maritima* (H.P.J.). At roots of plants, *e.g.*, the last named—and on flowers.

[*Emblethis*, Fieb., *E. verbasci*, F.—Oval, entirely ochreous, with black punctures. and bristly antennae and legs. Pronotum very wide, with rounded sides, anterior angles almost receiving eyes. Sandhills; very local].

Eremocoris, Fieb.—Much like *Aphannus*, but head longer (eyes not touching pronotum) and 2nd antennal joint much longer, projecting for more than half its length beyond apex of head. Lateral margins of pronotum each with a pale spot posteriorly, though the actual posterior angles are dark; anterior legs with tibiae more or less curved, and femora very strongly swollen and toothed beneath. Finely hairy. Spp. very local, occurring under stones, amongst dead leaves, etc.

E. plebeius, Fall.—Mesosternum simple; tibial hairs longer and erect. "Hants" (B.Br.H.-H.).

[*E. podagrieus*, F.—Mesosternum bituberculate; tibial hairs shorter and less erect (body throughout less pubescent). Front tibiae very obviously curved. Chiefly in chalky situations.]

[*E. fenestratus*, H.-S.—Basal joints of hind tarsi longer, more than twice as long as 2nd and 3rd together. Larger than the two preceding species. L. 7mm. Associated with pine and juniper; rare.]

Drymus, Fieb.—Short, oval or oblong; brown in colour, practically unspotted; eyes nearly touching pronotum. Antennae of the *Eremocoris* type, but 2nd joint shorter; anterior legs with tibiae somewhat curved, and femora thickened and toothed. L. $3\frac{1}{2}$ - $5\frac{1}{2}$ mm. In moss, dead leaves, etc.

[*D. pilipes*, Fieb.—Tibiae with long projecting hairs; abdomen beneath dull and closely punctured.]

[*D. latus*, D.S.—Abdomen shiny beneath, and quite smooth; tibiae with long fine hairs. L. $4\frac{1}{2}$ -5mm. Rather long; elytra dark reddish brown, legs paler. Usually in somewhat damp chalky situations, under leaves of *Nepeta glechoma*.]

[*D. pilicornis*, M.R.—Abdomen polished beneath, but with fine scattered ripple-like marks; tibiae long-haired. Much smaller, 3 - $3\frac{1}{2}$ mm.; elytra pale at base, legs dark. Chalkpits, amongst moss, etc.]

D. sylvaticus, F.—Tibiae without long hairs; pronotum entirely black, and much widened behind. A rather short oval species, sides of elytra rounded posteriorly. Common both on mainland and in I. of W. The brachypterous form (var. *picinus* id. O.C.=var. *ryei*, D.S.) occurs also in Hants.

D. brunneus, Shlb.—Tibiae without long hairs; pronotum brown at sides and behind, not much widened posteriorly (narrow in comparison with abdomen), but with very rounded sides. Sides of elytra much rounded posteriorly. Common in damp places on the mainland, amongst moss, etc. I. of W.?

D. piceus, Flor.—Much narrower than *brunneus*, and pronotum polished and impunctate in front, whereas in all the other Br. spp. of *Drymus* it is dull and punctured. Occurs locally in N. Forest (Butler and others). Most often obtained by sweeping in damp places.

Notochilus, Fieb. (*Taphropeltus*, O.C.).—Blackish-brown or ferruginous, with paler or darker markings respectively: small species, allied to *Scolopostethus* following. Head long, with a distinct neck, the eyes remote from pronotum; the last bears an obvious central impression, and has the lateral margins narrowly reflexed. Scutellum distinctly

impressed; front femora with strong teeth and incrassate; 2nd ant. joint long. In moss, dead leaves, at roots of plants, etc.

N. limbatus, Fieb.—Ferruginous; head and pronotum in front fuscous, extreme base and hinder angles of latter dark. L. $3\frac{1}{2}$ -4mm. Southsea (Moncreaff); Rhinefield, N. Forest in wet *Sphagnum*, 21.v.15 (J. J. Walker). Taken more recently in N.F. by other collectors.

N. contractus, H.-S.—Much darker; pronotum black, with a small pale spot on each side. L. $2\frac{1}{2}$ -4mm. Common. On nettles, amongst dead leaves, etc. I. of W.

N. hamulatus, Thoms.—Only recently recognised in Br. as distinct from *contractus*: smaller than that insect, with rather shorter, and therefore thicker looking, antennae; pronotum shorter, less widened behind, and rather more closely and rugosely punctured, the transverse impression less in evidence; elytra somewhat darker, especially at base, the small spot at the apex reduced to a minimum; corium less punctured.]

Scelopostethus, Fieb.—Eyes remote from pronotum, but head shorter than in *Notochilus*, scarcely contracted behind; lateral margins of pronotum sinuate, conspicuously pale and foliaceous posteriorly. Antennae of the *Eremocoris* type: pronotum centrally impressed; anterior femora with a single large tooth, between which and apex is a series of smaller spines. Small, rather elongate, brown species, prettily marked with paler and darker colour. L. $3\frac{1}{2}$ -5mm.

S. pictus, Schill.—Antennae longer than in all the following species, and entirely yellow; large femoral tooth situated nearer the middle. L. 5mm. A larger, brighter coloured species than its congeners. Butler (B.Br.H.-H.) mentions that he has always found this insect in stacks, and records it from Hants. It seems largely confined to a chalky soil.

[*S. grandis*, Hrv.—Mesosternum tuberculated in front of intermediate coxae; pronotum narrower behind; membrane in undeveloped form scarcely produced beyond apex of corium; 2nd antennal joint pale at base, gradually darkening towards apex. Local; on ground amongst dead leaves.]

S. affinis, Schill.—Mesosternum tuberculated; pronotum wider behind; membrane in undeveloped form produced for at least half its width beyond apex of corium; 3rd and 4th ant. joints, and apex of 2nd black. On nettles chiefly. Common on mainland. I. of W.: many localities.

S. thomsoni, Reut.—Mesosternum simple; 1st and 2nd ant. joints pale. Usually undeveloped, and slightly pubescent. On nettles, etc. Common, particularly in I. of W.

S. decoratus, Hbn.—Much like *thomsoni*, but usually developed, and practically glabrous; 1st and 2nd ant. joints black. Common on heaths, frequenting *Calluna*. Abundant in I. of W.

[*S. puberulus*, Hrv.—1st and 2nd ant. joints longer, and entirely pale; more pilose, especially near pronotal angles. Littoral.]

Gastrodes, Westw.—Very wide and flat; sides of elytra much rounded; front femora very dilated and flat, and strongly toothed beneath. Head long, constricted behind eyes, which are remote from pronotum. L. 6-6 $\frac{1}{2}$ mm.

G. ferrugineus, L.—Dull dark red; lateral margins of pronotum

pale only behind. On or about Scots pine; extremely common. Local in I. of W.?

G. abietis, L.—Slightly longer and more ochreous; lateral margins of pronotum pale throughout. Anterior femora greatly dilated. Under bark on spruce (*Abies*), and found between the scales of the cones in winter. Occurs locally in N. Forest (A. H. Hamm and others).

NOTE.—As the descriptions indicate, in determining the less distinct genera in *Aphanina*, attention should more particularly be directed to the form of the head and pronotum, the size of the eyes, and the position on the head of the last in relation to the anterior angles of the pronotum; the colour and comparative lengths of the antennal joints and the form of the hind tarsi also afford good distinguishing characters, whilst the general colouring can be relied upon to some extent (see also plate). Representation in Pal. region of species of *Lygaeidae* gathered under the various sub-families: *Lygaeina* 63; *Cymina* 13; *Blissina* 18; *Henestarina* 10; *Artheneina* 7; *Heterogastrina* 10; *Aphanina* 300?

Fam. 5. **Pyrrhocoridae**.—Ocelli absent even in developed forms. Pal. 16.

[*Pyrrhocoris*, Fall., *P. apterus*, L.—L. 8mm. Scarlet and black; membrane absent. Corium usually red with a large (round) black central spot, and scutellum black. Very local; S. Devon, etc. An abundant continental insect.]

Fam. 6. **Tingididae** ("Lace Bugs").—Small, usually oval, greyish bugs, recognisable by the very large cell-like puncturation or reticulation of the upper surface; the sides often very widely and delicately foliaceous, the expanded portions then like the rest of the integument almost membranous—i.e., filled with close clear areolae. Head and basal antennal joints strongly spined; antennae thickly formed, the 3rd joint longer than all the rest together. Tarsi two-jointed. Pronotum with three keels.

[*Larva*.—Body short, ovate, more or less spinous; antennae short, thick, 3rd joint much the longest.]

Sub-Fam. 1. **PIESMINA**.—Scutellum visible; clavus and membrane of elytra defined; ocelli present. Cheeks produced into two long horn-like processes. Pale dull grey or greyish ochreous. Pal. 12.

Piesma, Lep. *P. quadrata*, Fieb.—Pronotum with three keels in front. L. $2\frac{1}{2}$ –3mm. Littoral; on *Chenopodium*, etc. Lymington salterns, and Hurst Castle; common (H.P.J.). I. of Wight: Yarmouth, under maritime plants (Butler).

P. maculata, Lap. (*capitata* Br. Cat.)—Pronotum with only two keels. L. $2\frac{1}{4}$ – $2\frac{1}{2}$ mm. N. Forest, by general sweeping (H.P.J.).

Sub-Fam. 2. **TINGIDINA**.—Scutellum covered by angularly produced base of pronotum; clavus and membrane undefined; ocelli wanting.

Serenthia, Spin. *S. laeta*, Fall.—Very small. L. $1\frac{1}{2}$ mm. Oblong, three times as long as wide. Head rounded and obtuse, black; pronotum obtuse, black, elongate, with straight sides. Elytra entirely pale, with fine remote areolae. Bournemouth (Blatch); Lymington

salterns (Butler): Keyhaven (H.P.J.); I. of Wight? By sweeping in grassy places near the sea.

Campylosteira, Fieb. *C. verna*, Fall.—Brownish, oval; very small. L. $1\frac{1}{2}$ mm. Anterior margin of pronotum emarginate, without a hood or central projection. "Hants" (B.Br.H.-H.); Sandown, I. of Wight (Champion). In moss.

Acalypta, West.—Pronotum with a hood-like central expansion of the front margin. Rarely developed (therefore short) surface with fine clear areolae; 2nd antennal joint not rugose, and thinner than the apical one. Very small, ovate. L. $1\frac{1}{4}$ – $2\frac{1}{4}$ mm. In moss chiefly.

A. brunnea, Grm.—Pronotum with only a central keel. Greyish ochreous. N. Forest (Champion and others). Local; in moss on rotten stumps of trees, etc.

A. cervina, Grm. (*carinata*, Pz., O.C.).—Yellowish. Pronotum with normal number (three) of keels; foliaceous margins of elytra with two rows of meshes; head with four pale spines (two being prolonged antennal processes). N. Forest (Champion). Moss is said to be the usual habitat.

A. platychila, Fieb.—Marginal membrane of elytra angulated in front instead of rounded and "composed of between three to four rows of meshes." First taken in Br. by P. Harwood at Brandon, Suffolk, 29.v.12. A specimen in the Nottm. Mus. Coll. is labelled "Lichfield, Staffs. L. A. Carr. det. Butler."]

[*A. nigrina*, Fall.—Grey, more convex; sutural area of elytra with three rows of meshes; 3rd antennal joint pale, very slightly and gradually widened at the base. Note, in the rare macropterous form, which, except in the shape of the antennae, is not unlike a *Dictyonota*, there is frequently some variability in the number of marginal rows of meshes. In such cases the ferruginous 3rd joint of the antenna suffices to distinguish the insect from the species following.]

[*A. macrophthalma*, Fieb. (*marginata*, Wlff., O.C.).—Sutural area of elytra with two rows of meshes; antennae entirely black, third joint parallel sided.]

A. parvula, Fall.—Narrower; margins of elytra with only one row of meshes; pronotum longer. The macropterous form (rare) has more the shape of a *Monanthia*. S. Hants, fairly general (including I. of W.).

Dictyonota, Curtis.—Antennae extremely thick and rough; 2nd joint as thick or thicker than the apical one. Greyish ochreous, shiny; sides widely foliaceous, with clear areolae.

[*D. tricornis*, Schr. (Subg. *Acletha*, Kirk., O.C.).—Antennae black, 3rd and 4th joints with long hairs. *Mentha*, *Artemisia*, *Thymus* and (Notts) broom are mentioned as foodplants. Favours a chalky soil.]

D. strichnocera, Fieb.—Antennae black, 3rd and 4th joints without long hairs, 2nd joint enormously thick. L. $3\frac{3}{4}$ mm. On gorse usually; locally common, N. Forest, etc.

[*D. fuliginosa*, Cost.—The largest of the three Br. species. L. $4\frac{1}{2}$ –5 mm. 3rd and 4th antennal joints not long-haired; 2nd ant. joint yellow, longer and slenderer. Antennae throughout very much less thick. On old broom bushes where it occurs.]

Derephysia, Spin.—*D. foliacens*, Fall.—Antennae slender, finely hairy and rugose; central keel of pronotum terminating in front in a large crested process that almost covers the head. Surface with very

large even meshes, the margins beautifully foliaceous. Yellowish-grey, with a pearly lustre. Rather wide. L. $3\frac{1}{2}$ mm. This wonderfully delicate little insect seems fairly common in S. Hants (including I. of W.), and probably occurs generally in the county. In ivy chiefly, but also in moss, dead leaves, etc. (particularly in hedgerows).

[*Lasiacantha*, Stål.—Lateral margins of pronotum and elytra furnished with small bristle-like teeth; rostral channel closed in front. A number of examples of *L. capucina*, (Germ., were collected by J. H. Keys, June, 1919, from wild thyme growing on cliffs at the Lizard, Cornwall.]

Monanthia, Lep. (Brit. Cat.).—Rostral channel closed in front. Surface dull, either finely meshed or reticulately punctured; antennae not extremely thick.

Section I. (*Tingis*, O.C.). Sides of pronotum more or less widely flat and foliaceous (but less so than in *Derephysia*) with rows of small clear areolae. Grey, or greyish ochreous, with darker mottlings.

M. (*Tingis* id O.C.) *ampliata*, H.-S.—Expanded sides (marginal membrane) of pronotum rounded in outline, and much produced anteriorly, with four rows of small meshes. L. 4mm. N. Forest, and fairly generally. I. of Wight. On thistles as a rule.

M. (*T.*) *eardui*, L. Sides of pronotum rounded behind, then almost straight, and little expanded anteriorly, with two and three rows of meshes; margins of elytra with three rows of meshes. Smaller, narrower. ($3\frac{1}{4}$ mm.). Extremely common on thistles.

[*M.* (*T.*) *angustata*, H.-S.—L. 3mm. Sides of pronotum with one, of elytra with three, rows of meshes. By sweeping; rare.]

M. (*T.*) *ciliata*, Fieb. = *T.* (subg. *Lasiotropis*) *reticulatus*, H.-S., O.C.—Lateral margins of pronotum pilose. L. 4mm. A more delicate looking insect than its congeners, surface almost membranous, with large well defined meshes. On or near flowers of *Ajuga reptans*. N. Forest (Butler).

Section II. Sides of pronotum not more or less widely foliaceous, either almost simple, or curiously humped or swollen, and reticulated. Spp. with one exception brown or testaceous.

M. (*Catoplatys* id O.C.) *fabricii*, Stål. = *costata*, H.-H., Br. Is.—Sides of pronotum almost simple, slightly sinuate, and very narrowly foliaceous and reflexed. Pale brown. L. $3\frac{1}{2}$ – $4\frac{1}{2}$ mm. Easily known by the slender almost "bottle-neck" form of the pronotum. Hants (B.Br.H.-H.). In moss usually.

M. (*Physatochila* id O.C.) *quadrinaculata*, Wlff.—Sides of pronotum swollen, and reticulately rugose, the characteristic membrane here apparently, and in the species following, being broadly reflexed, and fused as it were with the thorax; lateral keels complete. Colour dark brown ♂ or pale chocolate brown (partly) ♀. L. 3 – $3\frac{1}{2}$ mm. On old apple trees. N. Forest (Fowler): Brockenhurst (Douglas and others); Boldre (H.P.J.).

M. (*P.*) *dumetorum*, H.-S.—Of similar form to *4-maculata*, but smaller, narrower, and paler, with only one row of meshes in foliaceous margins of elytra behind. L. 2 – $2\frac{1}{4}$ mm. On old lichen-covered

whitethorns and blackthorns. Common in N. Forest, and S. Hants generally, in woods, etc., where thickets of its foodplants exist.

M. (Oncochila id O.C.) *simplex*, H.-S.—Marginal membrane of pronotum so broadly reflexed that the consequent inflations cover most of the disc of the thorax, and thereby abbreviate the lateral keels. Ferruginous, head black. L. 3mm. N. Forest (Champion and others). I. of Wight; rare (Power). On low plants—e.g., *Senecio*.

M. humuli, F.—Orifice of odoriferous sac without a channel. Very similarly formed to *dumetorum*, but broader and somewhat larger. L. 4mm. Greyish, slightly bronzy, head black; margins of elytra behind with one inner row of very small meshes, and one outer row of very large meshes. Pondsides, etc., on *Myosotis palustris*. Locally common.

Fam. 7. **Aradidae**.—Allied to *Tingidae*, but lacks the delicate surface puncturation and reticulation found in that family. Antennae very thick and short, the joints truncate, more equal in length, the 2nd joint longer than the 3rd; tarsi two-jointed. Head large, and constricted behind. Brown or black, sub-oval, surface dull. Found under bark, in fungus, etc. Pal. 80?

Aradus, F.—Flat, pronotum with three longitudinal keels, and more or less serrated at sides. Scutellum angulated; antennary tubercles spine-like, and head with a lobe-like process in front. (Owing to its curious armature the head is almost trident-shaped.)

Section I.—2nd antennal joint longer than 3rd and 4th joints together.

[*A. betulae*, L.—Blackish-brown, marked with paler colour, especially along margins. 2nd ant. joint very long, and antennae comparatively slender; sides of pronotum (jagged) widely and arcuately foliaceous. L. 8-9mm. Rannoch, 9.vii.21, under birch-bark (P. Harwood).]

A. corticalis, L.—Shorter, narrower, much paler; 2nd ant. joint not very long, and antennae less slender; sides of pronotum (jagged) much less widely dilated. L. 7-8mm. Parley Heath (Dale); N. Forest, from fungus-grown beech stump (Blatch).

Section II.—2nd ant. joint not longer than 3rd and 4th joints together, but longer than 3rd; antennae shorter and very thick.

A. depressus, F.—Brown, rather brightly mottled: lateral margins of pronotum broadly white or very pale ochreous; elytra whitish; abdomen pale-brown. Pronotal margins scarcely jagged. L. 5-6mm. A rather variable insect in both size and colouring. N. Forest (Blatch); I. of Wight (Lewis). Not rare; under bark and in moss on stumps.

[*A. aterrimus*, D. & S.—Deep black. L. 6mm. Excessively rare in Br.]

Aneurus, Curt.—Remarkably flat (no thicker than paper), and comparatively smooth. Pronotum without keels; scutellum rounded. Elytra almost entirely membranous. Pitchy-brown, legs and antennae paler. L. 5mm.

[*A. laevis*, F.—Spiracles of 4th, 5th and 6th abdominal segments placed in lateral margins (♂ oblong-subovate; 4th dorsal abdominal segment with a high conical tubercle in middle). Under bark].

A. arenius, Duf.—Spiracles of 4th and 5th abdominal segments considerably removed from side margins, but those of the 6th segment placed in these margins. (♂ ovate; 4th dorsal abdominal segment with no trace of a tubercle). This species has only recently been separated from *laevis*, which last curiously has not been recorded definitely for Hants. Farnborough (Power). Taken (Br.) under bark of willow (Butler) and beech (Edwards).

Fam. 8. **Hebriidae**.—Very small and short. L. $1\frac{1}{2}$ mm. Sub-aquatic; abdomen beneath with close silvery pubescence as in the next family (*Gerridae*). Black or dark brown, with paler spots. In wet *Sphagnum*. Pal. 5.

Hebrus, Curt. *H. pusillus*, Fall.—Basal antennal joint projecting for more than half its length beyond apex of head. Darker; membrane with white spots. New Forest (Blatch). I. of Wight (Lewis).

H. ruficeps, Thoms.—Basal ant. joint much shorter, scarcely projecting beyond apex of head. Paler, with a reddish head; membrane (when existing) unspotted. Dimorphous, the wingless form being that most frequently met with. New Forest: Holiday Hill enclosure, abdt. in *Sphagnum* (Morley); Brockenhurst (H.P.J.).

Fam. 9. **Gerridae** (*Hydrometridae*).—Associated with water. Underside with close silvery pubescence; elytra of one texture—i.e., undivided into clavus, corium, and membrane—although strongly ribbed. Scent glands absent in both larva and adult. Pal. 46.

Sub-Fam. 1. **MESOVELIINA**.—Coxae contiguous or nearly so; scutellum visible; ocelli present.

[*Mesovelis*, M.R. *M. furcata*, M.R.—Almost always dimorphous. Very small, elongate. L. $1\frac{1}{2}$ – $2\frac{1}{2}$ mm. Greenish or testaceous, with darker transverse markings. Ponds, running rapidly on leaves of *Potamogeton*, etc. Probably not rare, or even very local, but difficult to perceive in its particular haunts.]

Sub-Fam. 2. **ÆPOPHILINA**.—Ocelli absent; coxae touching; scutellum visible. Submarine.

Æpophilus, Sign. *Æ. bonnairei*, Sign.—Short, sub-oval, finely hairy. Ferruginous, elytra and abdomen darker. L. $3\text{--}3\frac{1}{2}$ mm. Under stones, etc., below high-water mark. I. of Wight: Totland Bay (Champion).

Sub-Fam. 3. **HYDROMETRINA**.—L. 11–12 mm. Very elongate, linear, black, the head extremely long, longer than the thorax; eyes large and very prominent. Sub-aquatic. The only Br. species resembles an immature “stick-insect” (*Phasmidae*), and walks on the surface of the water. Coxae widely separated, and scutellum covered in this sub-family, and in the two others following.

Hydrometra, Ltr. *H. stagnorum*, L.—Ditch-sides and pond-margins. Well distributed and usually common. Most easily obtained by “sweeping” low vegetation bordering the water. I. of W.

Sub-Fam. 4. **VELIINA**.—Head short and wide, and form in general very different to *Hydrometrina*. Hind and intermediate femora not inordinately long and linear.

Microvelis, West. *M. reticulata*, Brm. (*pygmaea*).—Very small and short. L. $1\frac{1}{4}$ – $1\frac{1}{2}$ mm. Like *Hebrus* in shape and colouring, but apart from the widely separated coxae, and lack of ocelli, may be known by the shorter antennae, the apical joints of which are longer than the

others. Usually undeveloped. Ponds and ditches, frequenting the floating weeds. Common in S. Hants and I. of W.

Velia, Ltr. *V. currens*, F.—6.7mm. Elongate; basal joint of antenna long and curved. Reddish-brown and black, with large white spots. Dimorphous, the winged form rare, and referable probably in most instances to the *V. rivulorum*, F., of continental authors. Lives in companies on fast-running waters, and unlike *Gerris*, which this insect most resembles, moves the legs of the two sides alternatively, not simultaneously. Very common.

Sub-Fam. 5. GERRIDINA ("Skaters" or "Water-striders").—Elongate, pronotum long and wide, slightly constricted anteriorly; hind and intermediate legs very long and thin, the femora of both pairs extremely long, longer than the respective tibiae, and linear. Apical antennal joint very long. Black, or black variegated with pale brown (*Gerris*). Gregarious, and known to all from their habit of jumping along the surface of the water.

Gerris, F.—Section I.—6th segment of abdomen produced at each side into a more or less elongate spine. Large species, 16 or 17mm. long.

[*G.* (subg. *Limnoporus*, Stål.) *rufoscutellatus*, Ltr.—L. 17mm. More or less red; 1st antennal joint shorter than 2nd and 3rd together. Rare, but should occur in Hants.]

G. paludum, F.—L. 16mm. Entirely black; 1st ant. joint longer than 2nd and 3rd combined. Spines of 6th abdominal segment projecting beyond the genital segments. (The last are comparatively very narrow, and to the naked eye appear as a long central process of the 6th segment.) Almost invariably macropterous. Confined to stagnant waters. Locally common, N. Forest, etc. I. of W.

G. najas, D.G.—Very similar, but spines of 6th abd. segment shorter than genital segments. Rarely winged. On running water. Common; abounds on the N. Forest streams. I. of W.?

Section II.—Smaller species. 6th segment of abdomen merely angularly produced at sides, not distinctly spinose. Pronotum often more or less fulvous or yellow on disc, and pale at the sides.

[*G. lateralis* var. *costae*, H.-S. (= *G. costae*, O.C.)—Shorter and broader than any of the preceding, and unusually wide across the intermediate coxae. Pronotum fulvescent on disc. L. 13mm. Sub-alpine; loc. abundant in Scotland.]

G. thoracicus, Schm.—Very similarly coloured to *costae*, but paler, smaller, and less robust, not exceptionally wide across the middle coxae. L. 11-12mm. Common on ponds, and slow running streams. I. of Wight: Sandown, etc.

G. asper, Fieb.—Shorter than the last, and more resembling *costae* in colour. Abdomen beneath finely channelled, not simply carinated, and with longitudinal lines in the silvery pubescence. L. 10-11mm. A northern insect in Br., though more generally distributed on the continent.]

G. gibbifer, Sch.—Pronotum black on disc, lateral margins yellow only behind the anterior constrictions. L. 12mm. Ponds and ditches. N. Forest, Lymington, etc. Common I. of W.

G. lacustris, L.—Narrower and smaller than *gibbifer*. Pronotum black on disc, but lateral margins yellow also in front. ♂ without teeth.

on 6th segment of abdomen beneath; ♀ with 1st genital segment square and carinated longitudinally. L. 10mm. Dimorphous, wingless form rare. Ponds and ditches, extremely common. Abundant I. of W.

G. argentatus, Schm.—Hind tibiae and tarsi together about $\frac{2}{3}$ as long as femora, whereas in *lacustris*, and in the next species, the hind tibiae and tarsi together are almost as long as the femora. L. 7mm. Macropterous. Occurs on ponds. N. Forest: ponds about Brockenhurst, Boldre, etc. Locally common. I. of Wight?

G. odontogaster, Zett.—Like *lacustris*, but ♂ with two teeth on 6th segment of abdomen beneath, and ♀ with 1st genital segment transverse, and transversely impressed. L. 8-9mm. Dimorphous, brachypterous form rare. Ponds. N. Forest and Lymington; not uncommon.

In the families following none of the species are aquatic, and hence the undersides are not densely covered with silvery pubescence.

Fam. 10. **Reduviidae**.—Form and armature unlike that in any of the preceding groups. Antennae almost filiform; rostrum short and bent (beak-like) not lying flat against the undersurface of the head when in repose; eyes very prominent, and normally placed far away from anterior margin of pronotum. Elytra (when developed) composed of corium, clavus, and membrane. [*Larva*. Much longer than broad; antennae filiform; basal joint of tarsi extremely short, apical very long.] Pal. 300?

Sub-Fam. 1. **EMESINA**.—The most delicate of all the Heteroptera, resembling Nemocera (Diptera) particularly *Culicidae* (Gnats) in form and colour, on which insects they appear to prey.

Elongate, with extremely long and fine dark-ringed antennae and legs, as thin as the finest human hairs. Front coxae very elongate, extending beyond apex of head. [Pal. 26.]

Ploiaria, Scop. *P. vagabunda*, L.—L. 6-7mm. Antennae and legs usually pilose; apical antennal joint not $\frac{1}{3}$ as long as the 3rd joint. On trees (whence it may be obtained by beating), palings, etc. Well distributed, and often common. I. of Wight: several localities.

P. culiciformis, DeG.—Smaller, antennae shorter, the apical joint about half as long as the third; legs and antennae usually glabrous. L. 5mm. In thatch and faggots perhaps principally. N. Forest; not uncommon.

P. baërensprunqi, Dhrn.—Very like *culiciformis*, but bears an erect black spine at the centre of the base of the pronotum. N. Forest, where it was first noticed by G. C. Champion in June, 1894. Local, occurring amongst faggots, etc., and has been taken in company with *P. vagabunda*.

Sub-Fam. 2. **REDUVIINA**.—Front coxae not elongate, and species not gnat-like, much longer than broad, but robust; legs not very long and fine, with the front femora often thickened. Rostrum three-jointed. Colour brown.

Pygolampis, Grm. *P. bidentata*, Fourc.—Large, 16mm. Head long, parallel-sided behind eyes; hind legs much longer and thinner than the rest, the femora very long, longer than the tibiae (♀). N. Forest, by sweeping the railway banks near Wood Fildley one ♂, 22.v.14 (W. West). Very rare in Br., and scarce also on the continent, little being known as to its life history.

Reduvius, F. *R. personatus*, L.—Large, 16-17mm. Head short, suddenly constricted behind eyes; hind legs normal. Elytra well developed, the sides sub-parallel. Entirely dark brown. Old houses and out-houses mainly, active perhaps only at night. Its chief prey is said to be *Gimex*, but a nymph in captivity fed greedily on flies (cf. B.Br.II.-II.). "Hants" (Butler). Probably not uncommon, although I have only once met with it in the county—a specimen having been brought to me for identification at Lymington some years ago.

Coranus, Curt. *C. subapterus*, DeG.—Smaller, 10-11mm. long. Head large, and as long as pronotum, very broad between eyes, and gradually constricted behind. Elytra undeveloped; abdomen wider, the sides rounded and reflexed. On heaths. N. Forest: not uncommon; Bournemouth (Fowler).

Sub-Fam. 3. NABIDINA.—Rostrum 4-jointed. Rather long and narrow insects, smaller in the main than the above, elytra often undeveloped.

[*Prostemma*, Lap. *P. guttula*, F.—Pronotum smooth, shiny; black, with legs and elytra (usually much abbreviated) scarlet. Very rare in Br.]

Nabis, Ltr.—Pronotum dull, elongate, constricted into a narrow simple collar in front; rostrum slender. Colour some shade of brown or ochreous. Certain of the species (Div. II.) occur amongst grass, and as in other bugs with this habit approximate somewhat to dried grass bents in form and colour.

Section I.—Connexivum more or less reflexed, not separated beneath from inner portion of abdomen (Subg. *Aptus*, Stal., or *Nabis*, O.C.).

N. apterus, F. (*brevipennis*, Hahn.).—Rather large. L. 8-10mm. Brown, slightly mottled; connexivum dark brown with red spots; external margins of tibiae with long semi-erect hairs; antennae as long or longer than body. N. Forest, etc., not uncommon. Trees and bushes—e.g., hawthorn. I. of Wight?

N. lativentris, Boh.—Smaller, but rather similarly coloured. L. 6½-7mm. Connexivum as in last species, but with yellow spots, and tibiae externally with short decumbent hairs; antennae shorter than body. S. Hants generally, including I. of Wight. Developed form rare, but has occurred at Bournemouth (Saunders), and in N. Forest. On ground amongst low plants. Appears to be associated with ants.

N. major, Cost.—Ochreous brown, with fine black hairs; connexivum pale (yellow) throughout. L. 7-9mm. Always developed. Not uncommon, and well spread. Sandhills, at roots of plants, by sweeping, etc.

Section II.—Connexivum flat, and separated beneath from the central portion of the abdomen. Ochreous, often more or less striped longitudinally with paler or darker colour.

N. (subg. *Stalia*, O.C.) *boops*, Schdt.—Form short, compact; eyes very large, almost touching the anterior margin of pronotum; connexivum dark. L. 7mm. Usually brachypterous. Under heath (chiefly *Calluna*), and at roots of grass. Not rare. The macropterous form has been taken at Tidworth Penning, 22.vii.19 (G. E. Hutchinson). I. of Wight: Parkhurst Forest (Butler).

N. (subg. *Nabis* or *Reduviolus*, O.C.) *flavomarginatus*, Schltz.—Eyes

of moderate size, and remote from pronotum, in this and in all the following species. Abdomen above finely hairy, and dark, with pale central lines. L. 8-9mm. Dimorphous, the wingless form the commoner. Damp places at roots of grasses. Fairly common. Local in I. of W.

N. (subg. *Dolichonabis*) *limbatus*, Dhlb.—Abdomen above pubescent, and pale ochreous, with dark central lines; not very elongate, connexivum wide, foliaceous. L. 8-9mm. Very common by sweeping grass, etc.

[*N.* (subg. *Dolichonabis*) *lineatus*, Dhlb.—Rather similarly coloured to *limbatus*, and pubescent, but very long and parallel-sided; connexivum narrow, not foliaceous. L. 11-12mm. In marshy places, low down amongst rushes. Local, but certain to occur in Hants.]

N. ferus, L. (Subg. *Nabis* or *Reduvius*, O.C.).—Abdomen in this species and in those following, glabrous. Pronotum at base wider than long. Pale greyish ochreous. L. 8mm. By sweeping in dry places; usually common.

N. (subg. *N.* or *R.*) *rugosus*, L.—Pronotum at the base narrower than long. Pale yellowish ochreous. A wider paler insect than the next, and occurs in grass, etc. L. 7-8mm. Extremely common.

N. (subg. *N.* or *R.*) *ericetorum*, Schlitz.—Pronotum as in *rugosus*, and size similar, but this is a narrower, darker, reddish-brown insect, found on heath. Locally abundant.

[*N.* (subg. *N.* or *R.*) *brevis*, Schlitz. Differs from the two preceding species in its smaller size, and shorter front femora "which are much shorter than in *rugosus*, but only a trifle shorter than in *ericetorum*." The ♂ genital styles show decided differences. A greyer insect than *rugosus*, and found apparently only on marshy heathy ground.]

Fam. 11. **Saldidae** (*Acanthiidae*, O.C.).—Rather flat, oval, compactly formed bugs, with extremely large and prominent eyes. Antennae filiform, or slightly thickened at the apex. Rostrum long, stout, not lying against the prosternum. Elytra made up of clavus, corium, and membrane, the last often abbreviated, with four long sub-parallel cells, having their apices sub-parallel to the apical margin of the membrane. Entirely black, or black more or less conspicuously spotted with white, grey, and ochreous.

In *Chartoscirta* the ocelli are contiguous, and the insects are of more delicate construction than their allies. *Saldidae* occur on the ground, usually in swampy places, and both run and jump with great agility, rendering their capture difficult. The food of all the species appears to be of an animal character. Pal. 70.

[*Larva*.—Broad-oval; eyes very large; tarsi as in *Reduviidae*.]

NOTE.—The system of grouping here employed is dictated by circumstances, and is very far from being natural. The numbers indicate approximately the linear arrangement adopted in Oshanin's Catalogue.

Salda, F. (*Acanthia*, Fab., O.C.).

Group I. Lateral margins of pronotum pale; elytra largely pale ochreous.

[1. *S. (A., subg. Chiloxanthus, Reut., O.C.) pilosa*, Fall.—Broad-oval, covered with upright hairs. L. 5-6mm. Local, and found chiefly in England on the N.E. coast.]

2. *S. (A., subg. Halosalda, O.C.) lateralis*, Fall.—Narrowed in front, and glabrous. L. 4-5mm. Salt marshes, and mudflats near the seashore. Hayling Is. (Billups); Lymington (Blatch). I. of Wight: St. Helens (F. Morey). Locally common.

Group II. Pronotum black throughout; elytra usually more black than ochreous.

Section A. Rather large species, 6-7mm. Elytra entirely black, or inconspicuously spotted.

3. *S. (A., subg. S. or Sciadopterus, O.C.) littoralis*, L.—Clothed with extremely fine adpressed golden pubescence; dull. Elytra with a few small pale spots, or entirely dark. Salt marshes mainly, but occurs inland fairly frequently. Locally common in S. Hants, and occurs in I. of Wight.

[5. *S. (A., subg. Sciadopterus, O.C.) morio*, Zett.—Glabrous, very shiny; elytra unspotted, membrane very short. Much resembles the next species, but shows the following differences: elytra more shiny (almost with a burnished appearance), the punctuation obsolete or nearly so; eyes in ♂ seen from in front, not or scarcely wider than the face between them; thorax narrower, more constricted anteriorly, the sides straighter (=Brachypterous form). A northern insect in Br., frequenting high moorlands.]

[4. *S. oculata*, Mull. (= *A. muelleri*, Gml., subg. *Sciadopterus* O.C.).—With chief characters of the last, but differing as follows: surface less glossy, disc of elytra distinctly and somewhat closely if irregularly punctured; eyes in ♂ larger, each being decidedly wider than interval between them; thorax wider, less constricted in front, sides less straight (=Brachypterous form). The description given for *S. morio* ♀ in H.-H.Br. Is. seems to have been drawn up unwittingly from a ♀ of the present species. Rare, occurring inland on moors, etc., mainly in the northern counties. McGregor (cf. B.Br.H.-H.) says that in sunlight the insect is of a bright bronze blue colour.]

6. *S. (=Acanthia, O.C.) scotica*, Curt.—Narrower and usually slightly smaller than the preceding three species, the membrane fully developed; upper surface with rather long, erect, blackish hairs. Elytra with small ochreous spots, distributed somewhat after the fashion of the pale markings in *S. riparia*. Chiefly a northern insect, inhabiting the rocks and boulders by mountain streams.]

Section B. Smaller species, 4-5mm. Corium spotted with yellow, the lateral margins with a conspicuous yellow spot near the apex; sides of pronotum straight.

7. *S. (A.) orthochila*, Fieb.—Pronotum wide, base much wider than head across eyes (Face at apex, and basal joint of antenna above, yellow). Unlike most *Salda* species usually frequents dry situations, such as sandy commons and heaths. N. Forest, not uncommon. I. of Wight: several localities.

[16. *S. riparia*, Fall. (= *Teloleuca pellucens*, Fab., O.C.).—Pronotum narrower, the base hardly wider than head. Velvety black, with grey sheeny pile, yellow markings intense. Out of place in the present section, resembling *orthochila* only in its markings. N. Britain (including N. Wales)].

Section C. L. 3-5 mm. Lateral margins of corium pale almost throughout, or if simply spotted with yellow without a conspicuous pale spot near the apex; side of pronotum straight or rounded.

- L. persicae-crudum*. I have described, under this name, a form that was found infesting the foliage of a species of *Aralia* that was growing permanently in the open air. It is distinguished by its more depressed form and paler colour. The mature females are never so densely chitinized as in the type.
- L. capreae* (Linn.). This species also has a wide range of host plants. It occurs more commonly upon apple, hawthorn, hazel, horse chestnut, and elm. It is of a sub-spherical form, the sides often projecting beyond the base. It is usually of a paler shade of brown than is the preceding species.
- L. bituberculatum*, Targ. Confined to the hawthorn (*Crataegus oxyacanthae*). It is often very abundant upon the smaller branches of old hawthorn hedges. Though one of the largest of our British species it is so well "camouflaged" by a variegated pattern of black, white, brown, crimson and olivaceous tints, that it is extremely difficult to detect, especially as it usually takes up a position at the base of a thorn or a bud. It is of a strongly convex form and is well characterised by the presence of two prominent, rounded knobs on the dorsum.
- L. transvittatum*, Green. A rare species, originally recorded from birch only, but subsequently taken upon alder. It is relatively small and almost spherical in form. Living examples are black, with conspicuous, broken bands of white.
- L. ciliatum*, Douglas. Confined to the oak. Adult female approximately circular, moderately convex; olivaceous brown, appearing greyish from a thin covering of white powdery secretion. It is more particularly characterised by the presence of a fringe of delicate white filaments.
- L. zebrinum*, Green. On the smaller stems and branches of birch and aspen, more commonly on the young trees. Somewhat resembling *ciliatum*, but more highly convex; and without a marginal fringe. The mature living insect is strongly banded with black on a paler ground, but the pattern is more or less masked by a thin coating of powdery secretion.
- L. hesperidum* (Linn.) (fig. 5 a). This is, primarily a greenhouse pest; but is occasionally to be found on ivy, myrtle, and holly in the open. It differs from all our other British species in its form, which is flattish and elongate ovate, and in the fact that it remains relatively soft throughout its life. This condition is accompanied by an ovoviviparous habit, in which there is no necessity for a protective covering for eggs. The typical form is of a greenish yellow or orange-yellow colour, minutely speckled with darker spots. The variety *alienum* of Douglas (probably equivalent to *lauri*, Sign.) is of a duller, brownish olivaceous tint, closely speckled with darker spots. This variety is not uncommon upon the foliage of the bay (*Laurus nobilis*).

The genus *Pulvinaria* differs from *Lecanium* principally in the presence of a conspicuous ovisac, which is extruded from beneath the posterior extremity of the insect.

Pulvinaria vitis (Linn.) (fig. 5 c, d). On hawthorn, birch, alder, willow and various species of *Ribes*. It takes its special name from the fact that it is a recognised pest of the grape vine. The dull brown insect is rendered conspicuous by the snowy white, strongly convex ovisac, which is an accompaniment of the final stage of the female. The small, glassy, male puparia (fig. 5 d) are sometimes crowded together on the young twigs of the plant.

A second species of *Pulvinaria* (at present unnamed) was discovered, some years ago, by Professor Newstead, on a plant believed to be a species of *Saxifrage*.

In the genus *Lichtensia* the mature female is almost completely enclosed within a closely felted ovisac, only a small portion of the thorax being exposed.

L. viburni, Signoret. On foliage and young stems of ivy and *Laurestinus*. The former is the more usual host plant in this country. In the earlier stages it looks like a flat greenish *Lecanium*, and is then very inconspicuous; but after the completion of the snowy white ovisac, it is readily noticeable.

The genus *Luzulaspis* (= *Signoretia*) might be described as a very narrow and elongate form of *Lichtensia*, the ovisac covering all but the anterior extremity of the insect. There are, however, structural characters to justify the separation of the two genera.

L. luzulae, Dufour. On the foliage of the wood-rush (*Luzula campestris*). The elongate, narrow, snowy white ovisacs are sometimes conspicuous objects on rough pasture land.

L. scotica, Green. On undetermined grasses, in swampy situations. Superficially resembling *luzulae* though with a rather longer ovisac, but differing in microscopical structure. Two other species of *Luzulaspis* have been discovered quite recently; one of them occurring on the grass *Dactylis glomerata*; the other infesting *Carex remota*. Descriptions of these two species are now in the press and their names will—it is hoped—be available for inclusion in a supplementary appendix to this list.

The genus *Eraeretopus* is distinguished from other genera of the *Lecaniinae* by the presence of a deep fold across the middle of the tarsi of the front limbs, giving that segment the appearance of being 2-jointed.

E. formiceticola, Newstead. On *Dactylis glomerata*. The earlier stages of this insect are not yet known, but they may be expected to follow a development similar to that of *E. longicornis*. The insect is finally enveloped in a stout white cylindrical ovisac, which becomes detached from its support and falls to the base of the plant, where it is concealed amongst the crowded stems of the grass. Hitherto recorded from Guernsey only, it has recently been found in Somersetshire and the Isle of Wight. It probably occurs in many other localities in the south of England.

E. longicornis, Green. On *Carex ovalis*; on the upper surface, near the base of the leaves. Adult female orange-yellow, at first resembling an elongate, flattish *Lecanium*; but, subsequently, almost completely concealed by a closely felted, cylindrical, white ovisac.

Lecanopsis. It would be difficult to characterise this genus briefly and concisely. I will content myself with a reference to our only British species.

L. formicarum, Newstead. Early stages on the roots of grass; the nymph enclosed in a brittle, glassy test. The young adult females ascend the grass stems; but, after fertilisation, descend to the surface of the ground, where they construct loose, woolly ovisacs, filled with rose-red eggs, under moss and débris at the base of the tufts of grass. They are most frequently associated with the grass *Festuca ovina*. The insect itself is of a yellowish or reddish colour. The nymphal stage was originally regarded as belonging to a distinct species—*L. brevicornis*. The regular association of this insect with ants is doubtful, though occasional individuals have been taken in the nests of ants.

In the genus *Eriopeltis* the mature female is completely enclosed within a felted sac. The legs and antennae are atrophied.

E. festucae (Fonscolombe) (fig. 5 e). On grasses of the genus *Festuca*. This is probably the most conspicuous of all our British Coccids. The large, white, strongly convex ovisac may attain a length of 7mm. It is of a loose woolly texture and has many erect, projecting filaments, which give it a markedly shaggy appearance. The contained insect is of a pallid ochreous colour, the surface roughened like shagreen owing to the presence of numerous conical spines. The ovisacs usually occur singly, or separated from each other by considerable intervals; but I have seen a specimen, from Scotland, in which six ovisacs were crowded together, in close formation, on a single blade of grass.

In the genus *Parafairmairia* the adult female insect is covered with a glassy test divided into symmetrically disposed polygonal plates.

P. gracilis, Green (fig. 6). On various grasses and sedges. Test of mature female elongate, narrow, acutely pointed at both extremities, laterally compressed, the dorsal plates forming a sharp keel.

Physokermes is a very abnormal genus, quite unlike any other in the subfamily. The species are characterised by the complete absence of limbs and antennae in the adult stage, by their spherical form and by the presence of two large brood pouches in the cavity of the body.

Ph. abietis (Geoffroy). On the spruce fir (*Abies excelsa*). Although a relatively large insect, in its mature stage, it is extraordinarily inconspicuous, owing to its resemblance to the

unopened leaf buds of the plant. The young larvae take up a position, head downwards, beneath the bud scales at the base of the young shoots, and hibernate in that situation. After moulting twice, in the following spring, the adult female expands until its hind body is protruded beyond the scales, and finally assumes a more or less spherical form. Its colour—chestnut brown—simulates the unopened leaf buds. The male of this species is unknown.

In the subfamily *Asterolecaniinae* we find species enclosed within a horny or waxy test; often with a marginal fringe of paired filaments, which arise from figure of eight-shaped pores on the body of the insect.

The typical genus *Asterolecanium* (fig. 7) is the only one that is represented in our islands. The covering test is horny and translucent; usually with a conspicuous marginal fringe of glassy filaments.

A. variolosum (Ratzeburg). On the smaller branches and twigs of oak; occupying shallow pits in the cortex. The test is of a greenish colour, a darker patch at one extremity indicating the position of the sublying insect. The marginal fringe is often incomplete or imperfect.

A. thesii (Douglas). On *Thesium humifusum*. Test yellowish. In addition to a marginal fringe there is a longitudinal series of tufted filaments on the dorsum.

Of the subfamily *Eriococcinae* it is difficult to give any single character that is common to all the genera included in the group. The adult females usually have a pair of prominent, spiniferous (often densely chitinous) lobes at the posterior extremity of the body; but these are wanting in several anomalous genera that have been assigned to this subfamily. The antennae (when present) have never more than seven joints, and the terminal joint is relatively short.

The typical genus, *Eriococcus*, is characterised by the mature female insect being completely enclosed within a closely felted sac. The posterior lobes of the body are well developed, and conical spines are usually present on at least some part of the body.

E. devoniensis (Green). On *Erica tetralix*, causing distortion and convolution of the stems at the point of attachment. Sac white, subglobular. Insect orange-yellow; the dorsum thickly set with stout spines.

E. insignis, Newstead (fig. 8 c). On grasses. Sac white; elongate, narrow; surface relatively smooth. Body of insect with a continuous marginal fringe of spines.

E. greeni, Newstead (fig. 8 b). On grasses. The sacs, which are often attached to dead bracken and fallen leaves, are usually more ovate than those of *insignis* and, in fresh examples, exhibit numerous erect filaments. Dorsum of the insect with numerous spines.

- E. pseudinsignis*, Green. On grasses. Sac pale ochreous, elongate. Body of insect with scattered spines on the frons and median area of thorax in addition to the marginal fringe of spines.
- E. glyceriae*, Green. On the underground stems and rhizomes of *Glyceria maritima*. Sac whitish; broadly ovate. Colour of insect rose-red. Spines few, confined to the margins of the abdominal segments.
- E. inermis*, Green (fig. 8 a). On *Festuca ovina*. Sac small, hammock-shaped, creamy-white; surface smooth. Body of insect devoid of spines, except on the posterior lobes.
- E. placidus*, Green. On *Brachypodium sylvaticum*. Sac relatively large; ochreous or whitish; surface woolly. Body of insect without spines, except on the frons and posterior lobes.
- E. hoheriae*, Maskell. This is a species that must have been introduced from New Zealand (its only other recorded habitat) with its host-plant. It was discovered by Mr. J. C. F. Fryer, four years ago, upon *Hoheria* bushes growing in the open in the Scilly Islands. The species is easily recognised by the unusually large and densely chitinated posterior lobes.

The genus *Gossyparia* differs from *Eriococcus* in the covering sac being incomplete, leaving the greater part of the dorsum of the insect exposed. Posterior lobes strongly developed.

- G. spuria* (Modeer) (fig. 8 d). On the stems and branches of various species of *Ulmus*. At present recorded only from a few nursery gardens. Insect chocolate-brown, lying within what might be described as a fringed calyx of whitish felted secretion.

In the genus *Fonscolombia* the mature female is enclosed within a cylindrical ovisac. Body without prominent lobes or spines

- F. fraxini* (Kaltenbach). In crevices of the bark on the stems and branches of ash trees. Ovisac white, elongate, often contorted. Female insect brick-red. Male apterous.

In the genus *Cryptococcus* the mature females are practically apodous, the anterior and mid limbs are wanting, while the hinder pair are vestigial.

- C. fagi* (Bärensprung). On the stems and branches of beech trees. The mature females are enveloped in a loosely felted white sac. Insect honey-yellow. This is the notorious Beech Coccus. Males of this species have never been seen.

Kermes is a very anomalous genus, in which the adult females are naked and gall-like. In some of the species well developed limbs are present; in others the limbs are vestigial. The body is without a trace of the usual posterior lobes.

- K. variegatus* (Gmelin) (fig. 9 a). On the small twigs of oak, where they may well be mistaken for small Cynipid galls. This habit may possibly account for the apparent rarity of the

insect, for there is only one British record (Blean Woods, Herne, Kent). It was taken, on a single occasion only, by the late C. O. Waterhouse. The mature female is spherical; smooth and shining; ochreous or brownish yellow, marbled with dark brown or blackish bands. The antennae and limbs are fully developed, in this species, but can be of little use to the adult insect.

K. quercus (Linn.) (fig. 9 b). In the crevices of the bark and amongst the crowded adventitious buds on the stems of oak trees. The mature female is of the shape of a grape seed; the anterior extremity (which is buried in a crevice) narrowed; the hind body swollen. Colour yellowish brown to reddish brown, inconspicuously banded with black. Antennae and limbs vestigial.

The subfamily *Dactylopiinae* contains the so-called "Mealy-Bugs," of which we have several genera occurring in this country.

The genus *Phenacoccus* is distinguished by the presence of nine joints in the antennae of the adult females. The claws usually have a denticle on their inner edge. The males have four caudal filaments (fig. 10).

P. aceris (Signoret). More commonly on gorse; but occurring also on various trees, including maple, oak, elm, apple, and plum. Mature female pale green, thinly dusted with white mealy secretion. Ovisac white, large and conspicuous.

P. balteatus, Green. On the undersurface of the foliage of grasses; more particularly on *Arrhenatherum elatius*. Body with a close covering of white powdery secretion, with a marginal fringe of very short tassels, and with a pair of slightly longer tassels at the posterior extremity. Microscopically, this species is distinguished by transverse series of rosette-like groups of pores. At present, this insect has been found in the Cheddar Gorge only.

P. interruptus, Green. An obscure and apparently rare species, to be found low down on grasses in swampy meadows. Body covered with loose fluffy secretion, which is thicker at the two extremities.

The genus *Heterococcus* contains species otherwise resembling *Phenacoccus*, but distinguished by the character of the micropores, which are quinquelocular instead of trilocular.

H. nudus (Green). On grasses, concealed between the stems and the ensheathing bases of the leaves.

The genus *Pseudococcus* contains species in which the antennae of the female are 7- or 8 jointed. The claw is usually without a denticle. The male carries two caudal filaments only.

Ps. dactylis, Green. A rather large species peculiar to the grass *Dactylis glomerata*, where it is concealed beneath the ensheathing bases of the leaves. Originally recorded from Guernsey.

Ps. gahani, Green. On *Ribes sanguinolenta*, *Ceanothus* sp., *Laburnum*, and upon sprouting potato tubers. A somewhat troublesome pest in the garden. Adult female purplish grey, thickly coated with white meal. Margin of the body with a fringe of short, white, waxy tassels, the four hindermost tassels much longer than the others.

Ps. hibernicus (Newstead). Recorded, by Prof. Newstead, from "the crowns of various grasses and of the sea-pink (*Armeria vulgaris*). I have taken the species under the loose bark of fallen branches of oak lying on grass in pasture land. The insects had apparently crept into this shelter for the purpose of oviposition and had constructed their ovisacs there. Mature females purplish grey, thinly dusted with mealy powder; posterior extremity with four short waxy tassels.

Ps. newsteadi, Green. Under the bud scales and in crevices of the bark of beech trees. Mature female pale brownish ochreous; dorsum thickly and evenly dusted with mealy powder; abdominal segments with short waxy tassels.

Ps. paludinus, Green. On the foliage of various herbaceous plants. The early adult females weave tent-like shelters in the angles of the more prominent veins on the undersurface of the leaves. Adult female brownish pink, masked by a thin coating of white mealy powder. Posterior extremity with four short waxy tassels.

Ps. phalaridis, Green. Living, in small colonies, between the dry leaf sheaths and the green stems of *Phalaris arundinacea*, usually at a point where a side shoot has developed. The eggs are deposited in extensive masses of flocculent white wax.

Ps. pulverarius (Newstead). Concealed between the leaf-sheath and the flowering stems of various grasses. Mature female narrow and elongate; pinkish purple; posterior extremity with one (or two) pairs of short waxy tassels.

Ps. sphagni, Green. In nests of the ant *Formica picea*, and amongst the sphagnum moss surrounding the nests. Adult female pinkish, thinly dusted with mealy secretion. No waxy tassels were observed on the material examined; but, from the position and character of the ceriferous organs on the insect, it is probable that fresh examples would exhibit short tassels on the frontal and posterior margins.

Ps. walkeri (Newstead). On various grasses. The insects take up their position on the upper surface of the blades of the grass. At the slightest disturbance they detach themselves and fall to the ground where they quickly creep into shelter. Mature female densely covered with mealy secretion. This species is recognisable by the unusually long and stout waxy processes, which project forwards from the anterior and backwards from the posterior extremity.

The genus *Ripersia* includes a number of small species, mostly subterranean, many of which inhabit the nests of, or are associated

with, ants. Their characters are so obscure that it would be useless to attempt to distinguish them by their superficial appearance. They are mostly to be found at the roots of plants and are often exposed by turning over large stones. The males are unknown. The following species have been recorded from the British Isles:—*europaea*, Newstead, *subterranea*, Newstead, *donisthorpei*, Newstead, *formicarii*, Newstead, *tomlini*, Newstead, *halophila* (Hardy), and *scirpi*, Green. The last species occupies the crowns of the small rush—*Scirpus caespitosus*.

Between the *Ortheziinae* and the foregoing subfamilies there is a wide gap. In all the previous genera spiracles (in two pairs) are present on the thorax only. In the *Ortheziinae* and following subfamilies abdominal spiracles also are present. With the *Ortheziinae*, also, we arrive at genera in which the males are provided with compound eyes. The female insects are active in all stages. The dorsum is more or less covered with compact and waxy lamellae, and there is a marginal fringe of similar processes which increase in length towards the posterior extremity, where they coalesce to form a covering to the ovisac. This ovisac is firmly attached to the body and is carried at its hinder extremity. Males with compound eyes and a caudal tuft of delicate filaments resembling spun glass.

In the genus *Orthezia* we have adult females with 8- or 9-jointed antennae, and tarsi distinctly divided from the tibiae.

O. cataphracta (Shaw) (fig. 11 a). Under moss. Dorsal lamellae of the adult female flat, dense, plate-like, in two series. Legs and antennae reddish brown. More common in Scotland and the northern counties of England.

O. urticae (Linn.). On *Stellaria holostea*, *Teucrium scorodonia*, *Artemisia* and various other plants. Dorsal lamellae of adult female prominent, more or less erect, in four series. Legs and antennae dark brown. The sharply cut white lamellae give the insect the appearance of being modelled in plaster of Paris.

The genus *Newsteadia* is characterised by the females having seven joints only in the antennae. The tarsus and tibia are fused together, without any recognisable division.

N. floccosa (De Geer). Under moss. Dorsal lamellae of adult female looser and more flocculent than those of our two species of *Orthezia*; prominent; in two series. Legs and antennae pale brownish ochreous.

In the genus *Ortheziola* the antennae of the adult female have four joints only, and the prominent, tubular eye is fused to the basal joint. The tibiae and tarsi are in one piece, without recognisable division.

O. vejdoskyi, Sulc. (fig. 11 d). Under moss and logs of wood. The median dorsal area of the adult female is naked, without lamellae.

Genera of the subfamily *Margarodinae* are peculiar in containing species of which the females undergo a quiescent, encysted, nymphal

stage, interposed between the active larval and adult stages. Another peculiarity of the species in this section is that the adult females are without functional mouth parts. In some of the genera the mouth parts have disappeared altogether; in others they are vestigial. In the encysted nymphal stages the mouth parts are present and functional, but limbs and antennae are entirely wanting. The males may have compound eyes and a caudal tuft of silky filaments, or simple eyes and a single pair of simple filaments. The typical genus (*Margarodes*) includes the "Ground Pearls," so called from the nacreous test that encloses the encysted nymph; but this genus has not been recorded from the British Isles. The two genera, *Matsucoccus* and *Steingelia*, the sole representatives of the subfamily in this Country, are separable only by minute microscopical characters.

M. pini (Green). Discovered by the late F. C. Withycombe, on *Pinus sylvestris*, at Oxshott (Surrey). Adult female orange-red: at first exposed, but later concealed beneath a mass of white woolly matter, under loose bark or beneath the bud scales of the tree. It is possible that this insect may be identical with the Japanese species—*Matsucoccus matsumurai*, (Kuw.).

S. gorodetskia, Nasonow. On the stems of birch trees. Mature female elongate, narrow; of a dark slaty grey colour; subsequently secreting a conspicuous white ovisac. For the purpose of oviposition the insect prefers to secrete itself either between matted fallen leaves or in the dead and hollow stems of bracken at the base of the tree. The nymph of this species still awaits discovery. The male has a circle of ocelli surrounding the head, and a single pair of long, slender waxy caudal filaments. The species was originally discovered in Russia. England is the only other country from which it has been recorded.

I am now able to append a notice of two new species of *Leucaspis*, to which I referred in an earlier part of this article.

L. dactylis, Green. On the lower leaves of *Dactylis glomerata*. As in other species of the genus, all but the anterior extremity of the adult insect is concealed within an elongated snow-white ovisac. This sac is larger and stouter than that of its nearest ally—*L. scotica*, and is further distinguished by the posterior half being tricarinate. Average length of ovisac 8mm.

L. frontalis, Green. On *Carex remota*. Closely allied to *L. luzulae*, but fully twice the size of that species. It is, moreover, distinguished by a conspicuous prolongation of the frons. The elongate ovisacs have an average length of 10mm.

I have now reviewed all the indigenous species that, up to the present time, have been recorded from the British Isles; but I feel confident that many others remain to reward a diligent search (or rather searcher). Our pines, for instance, should produce several species of the genera *Leucaspis* and *Aspidiotus* which infest this tree on

the continent of Europe. Then, neither of the genera *Aclerda* or *Antonina* is, as yet, represented on our British list. Both *Aclerda subterranea* and *Antonina purpurea* occur, upon grasses, in France.

Our larger reeds (*Phragmites* and *Phalaris*) are likely to repay careful search, for species secreted between the leaf sheaths and flowering stems. And all the various grasses and rushes deserve careful attention. It is by no means improbable that some species of the interesting genus *Margarodes* may be (literally) turned up upon the roots of grasses or other herbaceous plants.

It should be noted that, though I have been talking of the *Coccidae* of the "British Isles," nearly all of our records relate to England alone, and to quite small areas of that. The distribution of species in Scotland and Ireland is practically unknown,

Finally, I may say that I shall be delighted to assist any of our members who may be inclined to take up the study of these interesting insects, and to determine any species that they may care to submit to me.

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Acronicta, Ochs. (1816): *Apatela*, Hb. (1806): *Pharetra*, Hb. (1822): *Viminia*, Chap. (1893): *Chamaepora*, Warr.-Seitz. (1909) *menyanthidis*, View.

Tutt, *Br. Noct.* I. 24 (1891): *Ent.* XXI. 85 (1888): *Barr. Lep. Br. Is.* III. 254, plt. 121 (1896): *Stdgr. Cat.* III ed. 132 (1901): *Splr. Schm. Eur.* I. 138, plt. 31 (1903): *South Moths Br. Is.* I. 196, plt. 103 (1907): *Hamp. Lep. Ph.* VIII. 134 (1909): *Warr.-Seitz. Pal. Noct.* III. 17, plt. 3i. 1909): *Gillm. Ent. Zeit.* XVIII. 127, etc. (1905).

Of the variation Barrett says, "Usually rather constant in colouring on the upperside, but in some specimens considerable blackening is shown on the outer edges of the first and second transverse lines."

The forms to be considered are—

menyanthidis, View., *Verz. Tab.* II. 50, plt. 2 (1789).

ab. *obsoleta*, Tutt, *Ent.* XXI. 85 (1888): *Br. Noct.* I. 24 (1891).

ab. *suffusa*, Tutt, *l.c.*

race *scotica*, Tutt, *l.c.* 86.

ab. *obscura*, Stroem.

ab. *sartorii*, Hockem., *Ent. Zeit.* XVIII. 29 (1904).

ab. *virga*, Gillm., *l.c.* p. 127 (1905).

ab. *arduenna*, Gillm., *l.c.*, p. 129.

ab. *jaeschkei*, Kujan, *Int. Ent. Zeit.* X. 141 (1917).

ab. *nigra*, Schaeff., *l.c.* XVIII. 276 (1925).

Tutt considers *menyanthidis*, the type form, (1) the pale form with very faint markings, *obsoleta*; (2) the large, bright, clearly marked form, *scotica*; and (3) the form powdered with black scales on the forewing, *suffusa*.

The Central Asian *turanica*, Stdgr., has been ascribed to this species. Tutt deals with this, *Brit. Noct.* IV. 91, App., as a form of *rumicis* to which it is usually attached.

ab. *sartorii*, Hockem., *Ent. Zeit.* XVIII. 29 (1904).

FIGS.—*l.c.*, figs. 3, 4.

ORIG. DESCIP.—"The ground colour is as in typical *menyanthidis* whitish with more or less intermixture of grey, on the other hand the whole marginal area from the white middle line of last transverse marking up to the margin is filled in with glossy black and the elbowed line is but very slightly apparent. Many examples also show a darkening of the basal area; but this is never so intense as that of the marginal area. The black scaling begins narrowly at the costa and comprises at the hind-margin the whole width of the basal area. The rest of the marking is as in the type form." Near Hamburg.

ab. *virga*, Gillm., *Ent. Zeit.* XVIII. 127 (1905).

ORIG. DESCIP.—"Probably this is a transition form (to ab. *sartorii*), which only shows a darkening of the marginal area, while the basal area is as in the typical form."

ab. *obscura*, Stroem.

This form I have been unable to trace. Possibly (or probably) refers to *euphorbiae*.

f. arduenna, Gillm., *Ent. Zeit.* XVIII. 129 (1905).

FIGS.—*Ann. Soc. ent. Belg.* XLVIII., pl. I. (1904).

ORIG. DESCIP.—Originally described by Haverkamp (Ann. Soc. ent. Belg. XLVIII. (1904), 187, but not named).

Gillmer (*Ent. Zeit.* XVIII. 129, 1905) redescribed it and named it *arduenna*.

"Ground colour not white grey but yellowish grey, which shows itself on all the wings, thorax and abdomen clearly. The basal area is paler in two males, yellowish-grey in the third. The discal area is much darkened brown-black and thus the basal and marginal areas are strongly in contrast, just as in the *ab. sartorii*, where the discal area is pale and the basal and marginal areas dark coloured. Only the inner margining of the outer transverse line is distinctly white, (with a trace of yellowish). The orbicular is visible in only one example, the reniform in all three is invisible owing to the extension of the central shade. Fringes yellowish-white. Hindwings almost uniform yellowish-grey, only somewhat paler in the middle." Hautes-Fagnes, Belgium.

ab. jaeschkei, Kujan., *Int. Ent. Zeit.* X. 141 (1917).

ORIG. DESCIP.—"On the forewings the ground colour is paler grey-blue than in normal imagines, all the black markings are sharply defined. The hindwings are typically white, but with a 3mm. wide, sharply defined black marginal band. Such a band, so far as I have been able to discover and members of the Society have informed me, has not been observed in any *menyanthidis*. It gives the specimen a peculiar appearance." Neugrabener Moor, Hamburg.

ab. nigra, Schaeff., *Int. Ent. Zeit.* XVIII. 276 (1925).

ORIG. DESCIP.—"Not only are the marginal and basal areas as in *ab. sartorii*, Hock., darkened black, but the darkening extends over the whole wing, the thorax and the antennae. There are slight remains of a paler band separating the marginal area from the basal. The hindwings are blackish grey." Near Hamburg.

Acrionicta, Ochs. (1816): *Apatela*, Hb. (1806): *Arctomyces*, Hb. (1882): *Viminia*, Chap. (1893): *Chamaepora*, Warr.-Seitz. (1909): *euphorbiae*, Schiff.

Tutt, in agreement with most writers, takes Fabricius as the original author. However one can easily recognise that the *euphorbiae*, Schiff., *Verz.* 67 (1775), whose larva feeds on *Euphorbia cyparissiae*, and is placed between *rumicis* and *megacephala*, is our species. Hence Schiffermüller must be accepted as the author. Hübner gives Schiff.

Rosel, *Ins. belust.* I. (2), pl. 45, figured this species and Goeze called it *lunulata-minor* (*Beitr.* III. (3), 203).

Rottemburg, in his notes on Hufnagel's *Schm. tab.* (*Naturf.* IX. 141, 1777), describes it under the name *cinerea*.

Hübner figures an insect under the name *cyparissiae* ♀, Hb. 615.

This Warr.-Seitz says is *euphorbiae*.

A most difficult species to deal with.

Tutt *Brit. Noct.* I. 24 (1891): Barr. *Lep. Br. Is.* III. 261, plt. 122 (1896): Smith and Dyar *Contrib. Acron.* 154, etc. (1898) = *Proc. Nat. Mus.* XXI.: Stdgr. *Cat. Hied.* 133 (1901): Splr. *Schn. Eur.* I. 139, plt. 31 (1903): South *Moths. Br. Is.* I. 197, plt. 103 (1907): Hamp. *Cat. Lep. Phal.* VIII. 158 (1909): Warr.-Seitz. *Pal. Noct.* III. 17, plt. 3g (1909).

Her.-Schäf. discussed Hübner's figures of *euphorbiae*: 12 a very large ♀; 529 a small ♂: 615 *cyparissiae*, h.w. never so banded, faulty in colour: 613, never so brown: all were the *euphorbiae* form. Of his own figures he said, 377 ♀ h.w. too small: 87, 88, 89 were *euphrasiae* and not *abscondita* as labelled. The *acuta* of Freyer, 255 he called *euphorbiae*. It is a dark form from Constantinople.

Warr.-Seitz figures five forms (1) *euphorbiae*, typical, more like *meryanthidis* in marking, but not in colour: (2) *myricae*, typical Scotch form: (3) *montivaga*, more than half as large again as *myricae* and not so uniform in marking, both sexes of the blue-grey coloration: (4) *esulae*, slightly smaller than *myricae* and of a sandy grey: (5) *euphrasiae*, luteous.

Barrett says "apparently not variable with us." But on the continent there appears to be at least a northern form, a Central European and Alpine form, and a southern form.

The forms to be discussed are:—

euphorbiae, Schiff., *Verz.* 67 (1775).

r. *obscura*, Stroem., *Dan. Vid. Sels. Skr.* 79 (1783).

r. *euphrasiae*, Brahm., *Ins. Kal.* II. 143 (1791).

f. *esulae*, Brahm. *Scriba's Beitr.* II. 118 (1791).

f. *cyparissiae*, Hb., *Noct.* 615 ♀ (1818).

f. *abscondita*, Treit., *Schn.* X(2). 5 (1835).

r. *paradoxa*, Bdv., *Ind. Meth.* 60 (1829).

r. *montivaga*, Gn., *Noct.* I. (V.), 57 (1852).

r. *myricae*, Gn., *Noct.* I. (V.), 59 (1852).

(sub-sp.) *noctivaga*, Grote, *Proc. Ent. Soc. Phil.* II. 437 (1864).

(sub-sp.) *sperata*, Grote, *Bull. Buff. Soc. N. Sci.* I. 81 (1873).

ab. *glaucoptera*, Petersen, *Lep. Fn. Est.* 59 (1902).

r. *parisiensis*, Obthr.-Culot, *N. and G.* I(1), 23 (1909).

ab. *fasciata*, Hanne, *Int. Ent. Zt.* X. 63 (1916).

This is evidently a very difficult species to deal with. Quenée gives descriptions taking four pages. Herrich-Schaeffer gives a long dissertation on its affinities and forms.

Tutt discusses *euphorbiae* the typical form, (1) the large alpine form of Central Europe, *montivaga*; (2) the form from the northern part of the British Islands, *myricae*; and (3) the Scandinavian form *obscura*.

Warr.-Seitz gives very distinctive figures of *euphorbiae* ♂ and ♀, *montivaga* ♂ and ♀, *myricae*, *euphrasiae* and *esulae*.

Spuler figures *abscondita* ♂ and ♀ which he treats with uncertainty

as a possible species, to which he puts the *glaucoptera*, Petersen, as a local form. He says it may be the more northern *euphorbiae* just as *euphrasiae* is the more southern form. His figure called *euphrasiae* v. *esulae* (zu rotbraun) is not *esulae*, which is much smaller, but the luteous *euphrasiae*.

r. obscura, Stroëm., Dan. Vid. Sels. Skr. 79 (1783).

ORIG. DESCRIP.—Aurivillius, Nord. Fjar. 39 (1892) says that the forewings are grey with obscure marks and that it occurs with the typical form in northern areas. Tutt suggests that it is either *myricae* or *montivaga*; the former is smaller and darker than the type while the latter is a large and dark form from Central Europe and Alpine areas. Hampson says that *obscura* is larger and darker, locates it from the Alps and Norway and drops the name *montivaga*.

r. euphrasiae, Brahm., Ins. Kal. II. 148 (1791).

FIGS.—Freyer. Neu. Beitr. II., pl. 177(?) : VI., pl. 537.

ORIG. DESCRIP.—“The markings of the upper wings in the present Noctuid are traced out much more distinctly than in *euphorbiae*, and show strong and black, since they in *euphorbiae* are more brownish; the powdering in *euphorbiae* is not so fine, the upper surface of the wings has less gloss than in *euphrasiae* (which is generally nearer *auricoma*), in which it is nearer *aceris*. Also in it there occurs either a more or a less strong yellowish suffusion of the thorax, which one misses in *euphorbiae*, which consequently is the distinguishing characteristic: finally in *euphrasiae* the reniform is markedly larger than in *euphorbiae*. They differ very much in the ground colour, some have white-grey forewings and others have them quite ash-grey; the markings in both are all very clear. The lowerwing is either grey or white and without distinction of sex.”

Brown (Dobrée) treats *euphrasiae* as synonymous with *montivaga*. This cannot be, as the latter is a mountain form and the former is luteous in tinge while the latter is like *myricae*.

Hampson Lep. Phal. VIII. 158 says “Pale, whitish or yellowish-grey.” S. Europe.

Warr.-Seitz says *euphrasiae* is the commoner form in France and S.W. Europe; it is paler than the type and more luteous. He thinks that the *paradoxa*, Bdv., is *euphrasiae*, although Guenée referred to it as a form of *aceris*, but the larva is totally different from that of *aceris* and feeds commonly on *Rhus coriaria* in Provence. He also considers *cyparissiae* ♀, Hb. 615, as *euphorbiae*, in which Hampson agrees. Her. Schäf. considers the figure as faulty in colour and marking.

Spuler says “Of pale whitish-yellow ground colour, delicately marked, the hindwings of the ♀ less darkened,” and he considers it a good species.

f. esulae, Brahm., Scriba's Beitr. II. 118 (1791).

Fig.—Rösel. Ins. belust. I. (2), 45.

ORIG. DESCRIP.—“The markings on the forewings in this *Noctua* are more distinct than are to be found in *euphorbiae*, particularly the black, whereas in *euphorbiae* they tend more to brown, further the hairscales of *euphorbiae* are not so fine as those of *esulae*, and the upper

surface of the wings has less gloss; then there comes the considerably larger reniform stigma and a stronger or slighter yellowish mixture in the hair tufts on the back of the thorax, which are wholly wanting in *euphorbiae* and is thus the chief character of distinction."

This form is usually ascribed to Hübner but it should be to Brahm who describes and names Rösels figure, *Ins. belust.* I(2), 45. He says that it has a striking similarity to *euphorbiae*, and he can find no satisfactory distinguishing characters other than the foodplant *Euphorbia esula*; whence the name.

f. abscondita, Tr., *Schn. Eur.* X(2), 8 (1835).

ORIG. DESCRIP.—Treit. discusses this species at some length, *Schn. Eur.* X(2), 6 (1835).

"They (the wings) are distinctly smaller than in any male example of the nearest species. The marking of the forewing is more obscure, the colour darker, with yellowish-brown suffusion. Of the bright white spotted costa in *euphorbiae* and *euphrasiae* no trace is to be seen. On the other hand the fringes are chequered much stronger and brighter. This last distinction is at the first glance very striking. The hindwings are brownish-grey as those of *auricoma*. They have in my specimen the distinction, that their fringes are alternately white and brownish streaked, which I have never found up till now. Probably I am describing the wings of a female, the hindwings of the male may be as always up to now paler and quite white."

Freyer said that the imago, II., f. 178, bred from his larva was very similar to *euphorbiae*, only differing slightly in size and powdering.

Guenée is quite uncertain about *abscondita* of which he could get no authentic examples, and relies on the figure of the larva by Freyer which is "not the same as that of any other allied species."

Hampson is the only modern author who treats *abscondita* as a separate species (omitting *Stdgr. Cat.*). He considers that *abscondita* of H.-S., figs. 87, 88, 89, is not that of Treit. In that he copies H.-S. himself, p. 184.

Warr.-Seitz. says that *abscondita*, Tr., is *esulae*, Hb.

H.-S. said that his own figure 378 had "too pointed wings," and that Freyer's figure 178, was "too regular and too darkly marked."

f. paradoxa, Bdv., *Ind. Meth.* 60 (1829).

ORIG. DESCRIP.—"Maxime affinis praecedentis et vix distincta colore albo-flavescente, lineolis undatis annulosoque magis obscuris; sed larva omnino alia. Hanc speciem facile reperiunt in rhure coriaria (*Rhus coriaria*), in Gallo provincia." It is placed next to *aceris*.

Boisduval, in his subsequent *Ind. Meth.* (1840) p. 94, placed his *paradoxa* as synonymous with the var. *candelisequa*, Esper, of *aceris*.

See above under *euphrasiae*.

(sub. sp.) *noctiraga*, Grote., *Proc. Ent. Soc. Phil.* II. 427 (1864).

FIGS.—*l.c.* plt 9, fig. 3.

ORIG. DESCRIP.—"Anterior wings dark grey varied with black; ordinary lines white. Basal space black, greyish on the costa; basal halfline white, bordered externally by a black line. Transverse anterior line white, widely lunulated, distinct, bordered externally by a

black line which commences from a broader black costal mark. Median space large, dark grey; median shade band blackish, traversing the reniform spot. Ordinary spots of the normal shape, distinct; reniform attenuated, black, with a hardly perceptible lighter centre; orbicular round, black, with an ill-defined greyish inner ring. Between the ordinary spots in the lower middle of the wing is a squarish black spot bordered externally by the median shade. Transverse posterior line white, acutely dentated, arcuated superiorly, preceded near the costa by a whitish mark and bordered on either side by a black line. Subterminal line broad, white, irregular, interrupted just before the internal angle. Terminal space black, narrow, reduced by the subterminal line, which at about the middle, nearly attains the external margin. Fringes white interrupted with black between the veins; costa with some black and white marks. Posterior wings uniformly dark brownish; immaculate; fringes lighter."

(Subsp.) *sperata*, Grote., *Bull. Buff. Soc. N.Sc. I.*, 81 (1873).

FIGS.—*l.c.*, plt. 2, f. 1 ♂.

ORIG. DESCRIP.—"Belongs to the section *A. myricae*, Guen. Clear blue-grey, the usual markings of the primaries distinct. T.a. line geminate, waved, component lines divaricate. Orbicular small very distinct, a blackish void annulet. Reniform well sized, also distinctly but less completely black ringed, crossed by the median shade. T.p. line regularly dentate, nearly straight, as usual inflected below median nervure. No sagittate marks; s.t. line pale, vague; a series of minute terminal black marks. Hindwings white, dusted costally; beneath white, a little dusted, no lines nor spots perceptible. 1·35 in."

ab. *glaucoptera*, Petersen., *Lep. Fn. Est.* 59 (1902).

ORIG. DESCRIP.—Described by Petersen as belonging to the *abscondita* form of *euphorbiae*. Only one specimen of *euphorbiae* is mentioned as captured near Reval.

Abscondita var. *glaucoptera*, Petersen., "minor alis ant. fusco-glaucis, posticis abdomineque fuscis."

Petersen informs us that Staudinger labelled one specimen as *abscondita*.

ab. *parisiensis*, Obthr.-Culot., *N. & G. d'Eur.* I(1) 23 (1909).

FIGS.—plt. II. 9.

ORIG. DESCRIP.—"In the old collection of Bellier, now in Oberthür's Mus. Most remarkable ab. I have seen. Very dark smoky grey, uniform, crossed by three lighter lines. One on the basal side of the discal area, straight in direction but made of short curves between the veins; the second similarly formed, but the components emphasised by black on the outer edge, the general direction forming a note of interrogation?; the third the submarginal wavy line. The hindwing is a dirty white."

ab. *fasciata*, Hanne, *Int. Ent. Zt.* X. 63 (1916).

ORIG. DESCRIP.—"With broad dark central band." Strasburg.

Acrionicta, Ochs. (1816): *Apatela*, Hb. (1806): *Viminia*, Chap. (1894): *Chamaepora*, Warr. (1909): *rumicis*, L.

Tutt quoted Linn. X^led. 1767, which is more extended than the X^ed. 1758, where it first occurs. It also is to be found in *Fn. Svec.* 1761.

Tutt *Br. Noct.* I. 25 (1891): *Barr. Lep. Brit. Is.* III. 265, plt. 123 (1896): *Stdgr. Cat.* III^ed. 133 (1901): *Splr. Schm. Eur.* I. 139, plt. 31 (1903): *South Moths. Brit. Is.* I. 193, plt. 103 (1907): *Hamp. Lep. Phal.* VIII. 93 (1909): *Warr.-Seitz. Pal. Noct.* III. 17, plt. 3i (1909).

Strange to say *rumicis* is omitted from *Hb. Verz.* 1822, although he figures it in 1802 *Noct.* 9 *Text* 159.

Barrett says "A rather variable species in the depth and extent of the black marbling." He reports pale examples from Scilly, Armagh and Down. (Note.—These are on the western verge of the area of distribution.)

Spuler says, "The species varies considerably but paler forms are never found," but see Barrett III. 266, and Tutt *Brit. Noct.*

Curtis has a good figure of *salicis*. The larva is that of *manyanthidis*.

In the north 1 generation June-July: Upper Italy 2 generations, April-June; July-August: further south 3 generations April; June; August.

The forms to consider are—

- rumicis*, L., *Sys. Nat.* X^ed. 516 (1758).
- ab. *litterata* (Schaeff) Panz., *Icon.* II. plt. 105 (1767): *Verz.* (1804).
- f. *salicis*, Curt., *Brit. Ent.* 136 (1829).
- ab. *euphorbiae*, Steph., *Ill.* III. 42 (1829).
- ab. *euphrasiae*, Steph., *l.c.*
- (sub.sp.) *diffusa*, Walk., *Cat. B.M.* XI. 708 (1857).
- f. *nobilis*, Greg., *Ent.* IV. 50 (1864).
- (sub.sp.) *indica*, Moore, *P.Z.S.* 47 (1867).
- r. *turanica*, Stdgr., *Stett. e. Zeit.* XLIX. 65 (1888).
- ab. *lugubris*, Schultz., *Soc. Ent.* XVI. 12 (1902).
- ab. (gen. I.) *alnoides*, Geest., *All. Zeit. Ent.* VIII. 312 (1903).
- ab. *suhriannah*, Gillm., *Ent. Record* XIV. 91 (1907).
- ab. *marginata*, Lamb., *Rev. Mens.*, IX. 22 (1909).
- r. *oriens* (Hamp.) Strand. *Lep. Phal.* VIII. 93 (1909): *Arch. Naturg.* LXXXI. A.11. p. 157 (1915).
- r. *pallida*, Roths., *Nov. Zool.* XXVII. 7 (1920).
- ab. *prüfferi*, Masl., *Pols. Pism. Ent.* II. 130 (1923).
- gen. II. *meridionalis*, Dann., *Ent. Zeit.* XXXIX. 119 (1925).

Tutt deals with *rumicis*, (1) the dark form *salicis*: (2) the grey brown form *euphorbiae*: (3) the pale yellowish grey form *euphrasiae*: (4) Gregon's *nobilis* which is *salicis*: and (5) the paler Central Asian form *turanica*.

ab. *litterata*, Panz. (*Namen. verz.*), Schaeffer *Ins.* II. (1804-1767).

FIGS.—*l.c.* plt. 105, f. 3-4.

ORIG. DESCIP.—Panzer names this coloured figure of Schaeffer as a new species. Werneburg says that he can only recognise a figure of *rumicis*. From the figure I put it as a form of *rumicis*. It has been

placed to *ligustri*. But in this latter species the prevailing suffusion is a black not a lighter shade. The figure is a brown with more lighter shades than one finds in *ligustri*, in which the large light area of the forewing is almost apical and not including the reniform stigma as in this figure. There is a light area near the base of the forewing as is usual in *rumicis* but the patagia are dark such as they never are in *ligustri*. The general colour is brown with a touch of ferruginous. The size is on the large side rather than on the smaller side as is *ligustri*. Herrich-Schäffer has even called it *brassicae*, but authorities do not agree with him. One must leave it as a form of *rumicis*. The hindwings also more resemble those of *rumicis*.

race *diffusa*, Walk., *Cat. Lep.* XI. 708 (1857).

ORIG. DESCIP.—Cinerea; thorax nigro conspersus; abdomen canum; alae anticae fusco ex parte nebulosae, lineis transversis nigris undulatis duplicatis; lunulis marginalibus nigris, orbiculari et reniformi nigro marginatis; posticae pallide cinereae, fusciscentemarginatae,

"Cinereous; thorax sprinkled with black. Abdomen hoary. Forewings shaded here and there with dark brown; transverse lines black, undulating, double; the black submarginal streaks between the veins ending in marginal lunules; orbicular and reniform spots with black borders, the former almost round, about one fourth the size of the size of the latter. Hindwings pale cinereous, with brownish borders."

Put under *rumicis* by Hampson.

race *indica*, Moore, *P.Z.S.* 47 (1867): *Hamp. Moths Ind.* II. 203, IV. 509.

ORIG. DESCIP.—"Male. Dusky black; forewings with a basal, double sub-basal, a small circular white centered orbicular mark, and a large quadrate reniform mark, three transverse discal lunulated lines, and a marginal row of spots black, more or less bordered with white; hindwing pale greyish brown. Palpi, head, and thorax hoary. Abdomen brown." Expanse $1\frac{1}{3}$. Bengal.

ab. *lugubris*, Schultze, *Soc. Ent.* XVI. 170 (1902).

ORIG. DESCIP.—"The forewings are not grey but deep black, coal-black (somewhat of the colour of the forewings of *Amphipyra livida*, Schiff.). From this ground colour the darker markings of the forewings stand out in only the slightest degree or are completely effaced. The white spot beyond the inner margin has remained and stands out very distinctly on the dark ground as in the typical form. The white and black (in the typical form white and grey) chequered fringes stand out very strongly from the rest of the wing area. The pale spots along the outer margin, which are most indistinctly developed in the typical form are only partially present in this aberration or they are wholly suppressed. If they be present they stand out the more distinctly against the dark ground, than in typical examples.

"The hindwings black-grey, even the body distinctly darker than in the typical form; the thorax deep black (as the ground colour of the forewings).

"On the undersides the forewings show a darker colour; the hindwing is broadly dark towards the margin, becoming much lighter towards the base.

"The difference from the typical form is so great that I consider a special name for it is quite justified."

Chodau and other places in Bohemia.

ab. gen. I. *alnoides*, Geest., *Ally. Zeit. Ent.*, VIII. 312 (1903).

FIG.—*l.c.*, fig. 4.

ORIG. DESCIP.—"Like *alni*. Forewing pale grey on the costa, broadly black on the inner margin, but interrupted by the pale grey post-medial line. The outer arrow-like mark is particularly emphasised as in *psi* and *tridens*." Freiburg.

These are of the first generation. *teste* Dann. *Ent. Zeit.* XXXIX. 119.

Hamp. *Cat. Lep. Ph.* VIII. 94 (1909). "Forewing with the inner area suffused with fuscous to post-medial line and with diffused oblique fascia beyond post-medial line below vein 3."

ab. *subrianna*, Gillm., *Ent. Rec.* XIX. 91 (1907).

FIG.—*Soc. Ent.* XXIV. 59 (1909).

ORIG. DESCIP.—"In the genus *Acrionicta*, Ochs., similarly marked aberrations of *A. psi*, L. (viz., ab. *bivirgae*, Tutt) and of *A. menyanthidis*, View. (viz., ab. *sartorii*, Hock.), have been named, so that it would appear advisable to name this parallel and beautiful aberration of *A. rumicis*. It has the basal and marginal areas of the forewings black, the middle area scarcely darker brownish grey than in typical specimens; the outer, light, transverse line obsolete (or suppressed), only the white mark in cell 1 b (anal cell) remains; otherwise the insect is typical=ab. *subrianna*, n. ab. This form is intermediate between the brownish grey type and the quite black form ab. *salicis*, Curt. The specimen is a ♀ and caught in the Palatinate."

ab. *marginata*, Lamb., *Rev. Mens.* IX. 22 (1909).

ORIG. DESCIP.—"Ground of forewings white with the black ordinary lines well marked. Lower wings of a yellowish white, with a black marginal border well defined, of equal width from the anal angle to the inner margins." Logne, Belgium.

r. *oriens* (Hamp.) Strand. *Arch. Naturg.* LXXXI. A. 11, p. 157 (1915).

ORIG. DESCIP.—"Larger and darker than the European form." Japan, W. China.

subsp. *pallida*, Roths., *Nor. Zool.* XXVII. 7 (1920).

ORIG. DESCIP.—"Differs from *rumicis* in being distinctly paler, but not so pale as *turanica*, Stdgr." Algeria.

ab. *prüfferi*, Maslowsey, *Pols. Pism. Ent.* II. 180 (1923).

FIG.—*l.c.*

ORIG. DESCIP.—"Alae obscuratae, macula alba obsoleta." The upperside of the forewings very dark, without the white inner marginal spot.

gen. II. *meridionalis*, Dann., *Ent. Zeit.* XXXIX. 119 (1925).

ORIG. DESCIP.—"As a rule the imagines of the first generation

are more unicolorous grey with sharper markings; the hindwings more feebly margined than in the summer generation. In very variegated examples of this there is often an ochre yellow tone in the hindwings. The first generation belongs to *alnoides*, Geest. The extreme (very rich) summer generation I must call *meridionalis*."

10 Genus: *Arsilonche*, Led. (1857) := *Apatela*, Hb. (1806) := *Simyra* Ochs. (1816). Treit. (1825) := *Symira*, Hb. (1822) := *Viminia*, Chap. (1894).

In 1816, *Schm.* Ochs. IV. 81, proposed the genus *Simyra* to contain *venosa*, Bork. (*degener*, Hb.), *nervosa*, Schiff. (*oxyptera*, Esp.), *musculosa*, Hb. (*pudorina*, Bork.) and *fluxa*, Hb.

In 1825, *Schm.* Treit. V. 280, described the genus *Simyra*, including the first three species, but omitting *fluxa* as the *extrema* in *Nonagria*, and describing a new species *punctosa*.

Hübner, in 1822, *Fers.* 240, established the genus *Symira* for *venosa*, with *pudorina*, *impura*, and other Leucaniid species.

Dr. Chapman, *The Genus Acronycta*, 23 (1893), says that he "was impressed with its close resemblance [as a larva], especially as a pupa, to *rumicis* and *menyanthidis*." After comparing the ovum, larva and pupa of *venosa* with those of *rumicis* in considerable detail, he concludes by saying, that in many features "there is rather an identity" than a resemblance between the two species, and a number of pupae of both species mixed together would be as difficult to separate as would be those of *psi* and *tridens*, except that the intersegmental membrane is black in *venosa* and brown in *rumicis*.

Smith and Dyar, *Contrib. Acronicta* 176 (1898), say, "This genus differs from *Acronicta* only in the weak tongue and fine hairy vestiture. There is, however, an entire absence of the Acronyctid appearance and maculation, which must be given some weight, and the superficial resemblance to *Leucania* is so great that the species has been twice re-described in that genus. In sexual characters the species agrees with the *auricoma* group of *Acronicta*. Our only species (American) is the same as the European."

Viminia, Chap. = *Arsilonche*, Led. = *Simyra*, Ochs. *albovenosa*, Goeze. (*venosa*, Bork.)

Smith and Dyar have determined *henrici*, Grote., to be identical with *albovenosa* (*Contrib. Acron.* 176).

In *Ent. Tids.* 48 (1885) Aurivillius sank his name *flavida* as representing the type *albovenosa*, Goeze. Hampson revived it as representing a "yellowish form."

Tutt *Brit. Noct.* I. 28 (1891): Smith *Contrib. Acron.* (1898): Barr *Lep. Brit. Is.* III. 274, plt. 123 (1896); Sttgr. *Cat. Ill.* 134 (1901): Splr. *Schm. Eur.* I. 141, plt. 31 (1903): South *Moths. Brit. Is.* I. 199, plt. 103 (1907): Hamp. *Lep. Phal.* VII. 177, fig. (1909): Warr.-Seitz *Pal. Noct.* III. 12, pls. 2ef, 4a (1909).

The forms to be considered are—

albovenosa, Goeze., *Ent. Beitr.* III(3), 251 (1781).

- renosa*, Bork., *Schm.* IV. 716 (1792).
 ab. (gen. II.) *degener*, Hb., *Noct.* 380 (1808).
 ab. *centripuncta*, H.-S., *Neu. Schm.* 4, fig. 24, 25 (1856).
 s.-sp. *henrici*, Grote., *Bull. Buf. S. Nat. S. I.* 10 (1873) plt. 1.f. 15.
 ab. *evanidum*, Grote., *l.c.* 16, plt. 1.f. 16.
 ab. *fumosum*, Morrison, *l.c.* 275.
flavida, Auriv., *Ent. Tids.* I. 38 (1880).
 race *murina*, Auriv. *Ent. Tids.* I. 37, plt. 1, fig. 2 (1880).
 ab. *albida*, Auriv., *l.c.* 38.
 ab. (gen. I.) *ochracea*, Tutt *Ent.* XXI. 99 (1888).
 ab. *argentea*, Tutt *l.c.* 100.
 ab. *tristis*, Bang-H., *Iris.* XX. 70 (1907).

Barrett says, *l.c.* 275, "Slightly variable in the degree of reddish or brownish tinge on the forewings and more so in the length and intensity of the dark longitudinal lines."

Of the variation Smith and Dyar say, *l.c.*, "The variation is almost entirely due to the condition of the insect and its relative freshness. In recent specimens all the described streakings are fully marked and we have the typical *alborensa*; after they have become a little faded by flight the grey changes to a luteous and we have *evanidum*. Mr. Morrison's *fumosum* is an abnormally dark form, in which almost the entire insect has become slate grey."

Tutt's *ochracea* appears to be a step, "yellow ochre with nervures pale ochre," towards the extreme *murina*, Auriv., of a deep red brown with lighter veins.

Tutt, *Brit. Noct.* IV. 92, stated that his *argentea* was the *albida* of Aurivillius, *Ent. Tids.* 38 (1880).

Tutt deals with *alborensa*, Goeze. = *renosa*, Bork. = *henrici*, Grote. = *flavida*, Aur., and (1) with the dark shades clearly developed, 2nd brood, *degener*, Hb.: (2) with central black spot, *centripuncta*, H.-S.: (3) the lines and dashes almost obliterated, American, *evanidum*, Grote.: (4) small, smoky, dark form, American, *fumosum*, Morrison: (5) silvery white, no ochreous, *albida*, Aur. (*argentea*, Tutt): (6) deep red brown with lighter veins, *murina*, Auriv.: (7) yellow ochre with pale ochre veins, *ochracea*.

Subsp. *henrici*, Grote., *Bull. Buf. Soc. N. Sci.* I. 10 (1873).

FIG.—*l.c.* plt. 1, f. 15.

ORIG. DESCRIP.—"Forewings above marked with longitudinal shades. There are no traces whatever of the ordinary spots or lines. All the veins are picked out by whitish grey scales and the interspaces streaked with olivaceous ochrey. This latter shade obtains prominently and broadly from the base of the wing below median nervure on the submedian interspace centrally to the external margin, before which it is attenuate, leaving the sub-median fold marked by grey scales, and the region along the internal margin of the wing above and below the internal nervure grey with scattered darker scales. The deep olivaceous ochrey colour extends along the discal cell, margining the median nervure superiorly, attenuate at base and widening to external margin on both sides of the fifth vein, which is as usual brought into relief by pale scales. A sub-obsolete series of dots at the base of the white fringes. Hindwings white. The darker shade is

more prominently perceivable on the post-apical interspace between veins 7 and 8."

ab. *tristis*, Bng.-Hs., *Iris*. XX. 70 (1907).

ORIG. DESCRIP.—"From S. Russia I obtained a number of examples of ab. *centripuncta*, H.-S., two of which were so different, not agreeing with one another in colour, that I think it right to separate both forms. The *centripuncta* has in general the whitish colour of *albo-venosa*, but is for the most part uniformly black, powdered, and probably a little less in size.

"Ab. *tristis* is much darker coloured and has the grey-brownish colour of *S. nervosa*, F., but then far more unicolorous. From ab. *murina*, Auriv., of Sweden and Finland, ab. *tristis* differs completely by the veins not being white. Both males and females are alike."

ab. *evanida*, Grote., *Bull. Buff. Soc. N. Sci.* I. 10 (1873).

FIG.—*l.c.* plt. 1, fig. 16.

ORIG. DESCRIP.—"Narrower wings, costal edge of primaries straighter. A great similarity with *henrici* in ornamentation and colour, but everywhere the grey shades of *henrici* are here obsolete, and the olivaceous tints on the primaries are wanting, and the interspaceal shadings are simply ochreous. The forewings are almost entirely pale ochreous, with the whitish veins and shadings less obvious and contrasting. The internal margin is ochreous, while it is grey in *henrici*. Slighter build than *henrici*."

ab. *fumosum*, Morrison, *Bull. Buff. Soc. N. Sci.* I. 275 (1873).

ORIG. DESCRIP.—"Closely allied to *henrici*, with which it agrees in form and structure. Anterior wings above, dark shining brownish drab, slightly increasing in depth from the base outwards. From the base beneath the median nervure there is a light linear shade extending one-third the length of the cell. All the nervures marked with lighter drab, particularly towards their termination. The costal margin appears lighter. Posterior wing above, uniform dark shining drab. Below, a diffuse blackish spot at the termination of the cell."

race *murina*, Auriv., *Ent. Tids.* I. 37 (1880).

FIG.—*l.c.*, plt. 1, f. 2.

ORIG. DESCRIP.—"Capite, thorace et alis anticis obscure murinis-griseis, his pilis basis et costis albis; alis posticis albidis margine late infuscato; abdomine griseo fusco."

Hamp. *Cat. Lep. Ph.* VIII. 178 (1909). "Head, thorax and forewings deep red-brown, the veins streaked with white; hindwing with the terminal area suffused with brown leaving white streaks on the veins.—Dalmatia, Sweden."

ab. *flavida*, Auriv., *l.c.* 38.

ORIG. DESCRIP.—"Capite, thorace et alis anticis flavidis vel stramineis. margine antico albo-conspersa et vitta abbreviata nigra a basi pone cellulam discoidalem extensa; costis dilutioribus; alis posticis et abdomine flavo-albida.

Hamp. *Cat. Lep. Ph.* VIII. 178 (1909). "Forewings yellowish."

ab. *albida*, Auriv., *L.c.*

ORIG. DESCIP.—“Capite, thorace et alis anticis albidis margine antico et costis albis; vitta nigra saepissime distincta; alis posticis niveis; abdomine alba.” [Viström, J. A. “Prov. Helsinglands Macrolep (Skolpsogram).”]

Hamp. *Cat. Lep. Ph.* VIII. 176 (1909). “Forewing with the ground colour white.”

NOTE.—By an unfortunate oversight two species of *Cymatophora* were omitted and several additional forms of other species have to be added. Rather than let these stand over indefinitely it was thought better to deal with them at the end of the section, the Bombyciformes, which has now been completed.

APPENDIX TO THE BOMBYCIFORMES.

Correct on p. (6), line 23 and p. (9), line 1, *pteryographa* (error in Seitz) to *petrographa*.

Add bottom of p. (10).

To the *abrassa* section of *G. derasa* = *pyritoides* add—
race *thibetana*, Houlb., *Lép. comp.* XVIII(2), p. 81 (1921).

FIG.—*L.c.*, f. 19.

ORIG. DESCIP.—“A little larger than *fraterna*, from which is it above all distinguished by its general coloration of a deeper and clearer chocolate brown. The apical angle of the forewings is obliquely truncated and the outer margin of the same wings is somewhat strongly curved. The costal margin is whitish, with some oblique brown spots; the white line which goes from the costa to the middle of the inner margin, is well marked and more angularly broken than in the *derasa* section of the genus; on the whole this line is more curved and the area which it limits, at the lower base of the wing, is rounded off near the outer portion in place of being at a sharp angle as in *derasa*; another oblique white line, arising from the middle of the base, goes to join this curved line near the costa and abuts upon it by two branches, forming a small triangular brown space. The disc of wing is of a velvety chocolate-brown, containing between the costa and the outer marginal area, four or five groups of zigzag lines, more rounded than in the *derasa*-like forms. The apical and the outer angle are each adorned by an ovoid brown spot, limited on the inner margin by a whitish line. The outer margin is furnished with festoons, represented by fine white lines. The lower wings are uniformly brown, without marking, the fringe is of a reddish-yellow.”

The Eastern frontier of Thibet. Ta-tsien-lou.

Belongs to the *abrassa*-form section of *derasa*-forms.

On p. (12), line 13, for *albopuncta* read *albopunctata*.

Add to the bottom of p. (15) to *T. batis*.

ab. *phaea*, Dnbl., *Ent. Zt.* XL., 400 (1926).

“In which the rose colour is changed into a whitish olive brown.”
S. Tyrol.

Add to the bottom of p. (15) to *T. batis*.

Subsp. *diminuta*, Houlb., *Lép. comp.* XVIII(2), p. 107, pl. 488, fig. 4,014 (1921).

FIG.—*l.c.*, pl. 488, fig. 4,014.

ORIG. DESCIP.—“Coloration, uniform olivaceous brown, above. Forewings elongate, outer margin rounded and sinuous, slightly hollowed out on the inner margin, a little before the whitish spot. The spot at the base of the wing is elongate and of a rose colour; the two other spots which are placed, the one in the middle of the costa and the other at the apical angle, show the same coloration; the spot at the inner angle is well tinged with yellow. The hindwings are of a uniform coloration, although deeper along the outer margin, they are bordered by a fine fringe of orange yellow. Below, the wings are a little paler with a satin reflection.” Tschou (1 example).

This is another ab., race, subsp. or species (representative) which may belong here.

Add to p. (18) after line 14 to *C. ocularis* (*octogesima*).

ab. *franckii*, Boegl., *Mitt. münch. ent. Ges.* XX., 20, fig. (1920).

FIG.—*l.c.*

ORIG. DESCIP.—“The specimen corresponds to the *albingensis* form of *C. or*; it is darkened the same only both the transverse lines of the forewings are retained. But just the presence of these transverse lines from their disposition allows us to recognise the insect without a doubt as an *octogesima*. Moreover it is evident, apart from the more striking size, as well as the circumstances around it, that the pale band lining the marginal area of the hindwing, which is always present in *octogesima*, but never found in *or*, affords a very good recognition, although it is not so strongly and distinctly developed as in normal specimens. But the characteristic paling of the basal area, not very apparent in the case of normal *octogesima*, is much more so in this specimen since the marginal area is blackish darkened. (In the figure given the hindwing is altogether much too pale). It must be noted that the greenish-white, black-brown suffusion of the stigmata is not similarly developed. While they appear separated from one another on the R. forewing, on the left they are run together.” Valenciennes.

Add to p. (28) after line 3, to *C. or*.

f. *clausa*, Wehrli., *Verh. Gess. Basel.* XXVIII., p. 242 (1917).

ORIG. DESCIP.—“From Allschwil near Basel, distinguished by its discal area being narrower and restricted on the inner margin by the coalescence of the transverse lines.”

ab. *fasciata*, Stokl., *Pols. Pismo. Ent.* I., 59 (1922).

ORIG. DESCIP.—“Forewings with a pale grey band across the middle, 3-4mm. wide.” Poland.

ab. *juncta*, Kauchi., *Polsh. Pism. Ent.* I., 40 (1922).

ORIG. DESCIP.—“*Alis anticis strigis anteriore et posteriore prope marginem inferiorem confluentibus.*” Poland.

The forewings with the streaks confluent near to the hind-margin.

Add to p. (28) line 4 after "Strand" and delete the words in brackets [I have . . . known].

ab. *tangeus*, Strnd., *Ent. Nachr.* II., hft. 1 (1928).

FIG.—*Ent. Tidskr.* 1915, p. 19, fig. 3.

ORIG. DESCIP.—"The transverse lines running very near together, touching one another slightly below the reniform stigma, then diverging somewhat, and closely approaching one another again near the hind margin, but without quite touching." Ekerö (an island in Måla, Sweden).

Add to p. (29) after line 38 the following two species which were inadvertently omitted.

Cymatophora duplaris, L.

ORIG. DESCIP.—Linn. *Fn. S.* ed. 2, p. 352 (1761).

Tutt is in error in citing Linn. *Sys. Nat.* ed. 12 (1767). The description from the *Fn. S.* reads thus—

"Alis superioribus cinereis nebulosis; medio punctis duobus atris parallelis."

"Alae superioribus cinereo-nebulosae, in medio transverse albidiores; puncta duo atra, exteriore recurvo, parallela nec uno alterum. Alae inferiores pallidae subtus puncto centrali fusco. Affinis Noctuis."

Hufnagel named it *bicolorata* (1767); Brahm, *ruficollis* (1791); Borkhausen, *bipuncta* (1792); Ernst and Engramelle, "*Le colon*" (1792); Fabricius, *binotata* (1793); Hubner, *undosa* (1799?); and Esper, *bicolor* (1799).

Tutt *Brit. Noct.* I. 4 (1891); Barrett *Lep. Br. Is.* III. 193, plt. 116 (1896); Sttgr. *Cat.* ed. 3, no. 2848 (1901); Splr. *Schm. Eur.* I. 335, plt. 78, 21 (1908); South *M.B.I.* II. 89, plt. 39 (1907); Warr (Seitz) *Mac-lep. Bomb.* II. 327, pls. 49h, 56a (1912).

The error in Tutt's citation of the original description does not affect the two forms he considered, *argentea* and *obscura*, the Irish and Scotch forms respectively.

The list of forms to be considered are:—

race *argentea*, Tutt, *Ent.* XXI. 47 (1888); *B.N.* I. 4 (1891).

race *obscura*, Tutt, *l.c.*

ab. *unipuncta*, Splr., *Schm. Eur.* I. 335 (1908).

race *pulverosa*, Warr. (Seitz), *l.c.*

var. *brabantia*, Derenne., *Rev. Mens.* XXV. 56 (1925).

race *clara*, n.r.

race *britannica*, n.r.

race *kamschadalis*, Shelj., *Iris.* XL. 61 (1926).

It may be assumed that the darkest British specimens, which are "nearly black" (Barrett), "quite the darkest almost black" (South), mainly from Lancashire and Cheshire, are the typical Linnean form.

ab. *unipuncta*, Splr., *Schm. Eur.* I. 335 (1908).

ORIG. DESCIP.—"In place of the reniform stigma, two black dots are found; rarely is only the first of these present."

I have seen no example where both these are absent. The figures in South, plt. 39, 1-3, want both these, but is probably an error in printing. The two spots have the appearance of being tufts, an illusion only dispelled by a lens.

race *pulverosa*, Warr. (Seitz), *Pal. Gr. Sch.* II. 327 (1912).

FIG.—*l.c.*, plt. 56b.

ORIG. DESCRIP.—“Powdery leaden-grey without any brown admixture, with the base and the subterminal line showing paler from the dull grey ground colour.” Swiss Alps and Pyrenees.

subsp. **britannica**, n.r. The ordinary Southern British form.

subsp. **clara**, n.r. The Central European form.

The ordinary southern and central British form is far from typical, with its palish grey ground, with none of its features clearly or sharply cut, often with whitish edging to the transverse markings, and when compared with a series from various parts of central Europe show out quite characteristically from the sharply lined and banded, much more definitely marked form, which again is not the typical Linnean race. This European race may well be named *clara* and the ordinary British form be designated as *britannica*.

race *brabantia*, Derenne, *Rev. Mens.* XXIV. 56 bis (1924).

ORIG. DESCRIP.—“The examples, captured near Hal by our colleague Van Schepdael, have the forewings of a uniform leaden-grey colour, only allowing by a lighter area a band of dirty white in the middle of the wing, spotted with the two black points which are characteristic of the species. The lower wings are of a uniform tint slightly lighter than the upper ones.”

It differs from Tutt's *obscura* which is entirely leaden-grey with clearer base, and also from Warren's *pulverosa*, which is powdered grey without any brown suffusion.

race? *kamschadalensis*, Shelj., *Iris.* XL. 61 (1926).

ORIG. DESCRIP.—“These specimens agree in size with the smallest European examples. Expanse 13-15mm. The two black dots in the middle of the forewing are distinctly united by a dark streak. The pale middle band is distinct and fairly wide. The hindwings are pure white; there is only a fine dark marginal line and inside this a very narrow and somewhat indefinite, dark, marginal band. The discoidal spot is very indistinct. The forewings on the underside are much paler than in European examples and apart from the very small cell-spot appear wholly without markings.” 3 ♂s from near Petrapavlovsk.

Cymatophora fluctuosa, Hb.

ORIG. DESCRIP.—Hub. *Samm. Eur. Schm. Noct.*, 212 (1802).

Tutt says “the species offers no points of variation worth noticing.” *B.N.* I. 5.

Brown (Dobrée), *Cat. Eur. Noct.*, p. 2, reports one aberration in which “the transverse whitish band almost obscured towards the inner margin.”

Barrett says (*l.c.*) III. 197; “rather variable in size and in distinct-

ness of rippled lines beyond the broad central band. Specimens from Ireland are sometimes large and pale in colour."

I know of no named forms.

Add to p. (43) after line 20 to *D. alpinum*.

ab. *fasciata*, Leuz., Osthelder's *Schm. Sudbayern*, I., 2.2, p. 226 (1927). [Beil. to *Mitt. Münch. ent. Gesells.*]

ORIG. DESCRIP.—"With continuous black band in the discal area of the forewing: one example."

Add to page (44) after line 36 to *D. caeruleocephala*.

ab. *coalita*, Meves., *Ent. Tidskr.*, p. 41 (1914). Warn. *Ent. Zt. XXXVI.*, p. 8 (1922).

ORIG. DESCRIP.—"Specimens from Torreby and Martebo in Sweden in which the two 8-form spots are united into a single one with two grey centres."

ab. *confluens*, Damm., *Ent. Zeit. XXXV.*, p. 100 (1921).

ORIG. DESCRIP.—"Specimens in which there was a union of the 8-form stigmata by a broad extension of the outer margin of the orbicular and of the inner margin of the reniform. Thus there is the appearance of only one very large stigma, the orbicular being much enlarged and its lower half being particularly broad and sharply angled."

Warnecke, *Ent. Zeit. XXXVII.*, p. 8 (1922), points out that ab. *confluens*, Dammer, is the same as ab. *coalita*, Meves.

race *capnodes*, Dnbl., *Ent. Zt. XXXIX.* p. 152 (1925-6).

ORIG. DESCRIP.—"This appears to differ by its greyish black ground colour, especially the central area, without the bluish violet tone, which reduces the emphasis of the lines and bands and overgrowth of the blackish tones beyond the stigmata, so that the hinder spot appears to engulf the whole of the stigmata markings. The usually bright reddish yellow grey toned basal area is here generally suffused by extreme blackish tone. In extreme specimens the whole wing becomes uniformly black grey, in the middle of the costa (in place of the distinct stigmata markings) it is only slightly brightened. Hindwing evenly strongly powdered, distinctly darker than in the typical form. Wing fringes blackish." S. Tyrol.

*Add to p. (57) after line 15, to *A. leporina*.

ab. *alba*, Gillm., *Ins-börse.*, XXIII. p. 118-122 (1906).

ORIG. DESCRIP.—Slevogt, *Kurland Fauna*, p. 67 (1903) described a form of *leporina* as "Wholly markingless white." This Gillmer in 1906 named *alba*. *Ins. börse.*, XXIII. 119 (1906).

Add to p. (60) after line 18 to *A. megalcephala*.

ab. *slumbergeri*, Schultz., *Ent. Zt. XX.* p. 73, 2 figs. (1906).

FIGS.—*l.c.*

ORIG. DESCRIP.—The description is a very long one; it is summarised here.

The distinct marking of the upperside of the forewings is far more indefinite than in *megalcephala*.

The black transverse line before the margin on the upper side of

the forewing is clearly fragmentary in *megacephala*, here it is only slightly bowed and runs almost parallel with the margin.

The black transverse line on the upperside of the forewing is removed far nearer the margin than in *megacephala*. The grey outer marginal area beside it up to the margin does not measure 2mm., while in an example of *megacephala* corresponding in size it is about double as broad.

The clear transverse line before the margin on the upper side of the forewing in *megacephala* is very narrow, but in this example is very wide in its lower portion up to the reniform stigma towards the costa. In *megacephala* it is very sharply margined at the base, in this form it is very indistinct.

The lighter marginal area on the upperside of the hindwing which is distinct in this form is completely wanting in the *megacephala* before me.

On the underside of the forewing of this form the transverse somewhat sharply curved line beginning about $\frac{1}{3}$ from the outermargin is absent, but is present in *megacephala*.

The dark transverse slightly curved line on the underside of the forewing running from the costa to the inner margin near the outer margin parallel with it is wanting in *megacephala*, but can be seen in the new form.

On the underside of the hindwing, a fine, darker, slight toothed antemarginal line is distinctly marked in this form parallel to the slightly emphasised marginal line; this is wanting in *megacephala*.

The underside differences are equally divergent.

Silesia.

Add to p. (63) after line 22 to *A. alni*.

ab. *niromarginata*, Gelin, *Cat. Lep. d'ouest Fr.* 89 (1912).

ORIG. DESCIP.—“Has the lower wings bordered with a more or less wide black margin.” Deux-Sevres, West of France. More than half the examples taken are of this form.

Add to p. (64) after last line, to *A. tridens*.

(subsp.) f. *radoti*, Cerf., *Bull. Soc. ent. Fr.* 1924, p. (28).

ORIG. DESCIP.—“Differs from the typical form. The ground of the forewings of a much deeper and more uniform grey, without any lighter spaces; the sub-basal and submedian lines formed of one unbroken black marking, of uniform width their whole length, with scarcely indicated blunt teeth; the former goes in a straight line from the costa to the middle of the space 1-2 forming two short teeth on the radius and the cubitus; the second, just as straight from 9 to 4, slightly incurved between 4-3, ends at 3 on the dorsal margin by a regular curve; the black markings on the fold of 1c are wide and long, the basal going considerably beyond the sub-basal line, and the distal beyond the submedian; an interneural mark between 5-6 is small, distinct, and stops at the submedian; there is no brown shade below this line, nor any lighter subterminal area; marginal dots obsolete; orbicular stigma rounder, lighter, about a millimetre removed from the reniform, and joined on the side by a thick brown shade, which in typical *tridens*, abuts on the reniform.” Marrakesh, Morocco.

Add to p. (74) after line 3 from the bottom to *A. euphorbiae*.

ab. *debilis*, Demais. *Bull. Soc. ent. Fr.* p. (308), 1925.

ORIG. DESCRIP.—“Forewings are very bright, of a yellowish grey, with markings almost suppressed, except the contours of the orbicular and reniform stigmata, which are pretty well marked in black. The hindwings are white, slightly suffused with grey.” Rheims.

Add to page (77) line 6 from the bottom, to FIG.—*l.c.*
fig. 10 very obscure.

Add to page (78) after line 5 to *A. rumicis*.

r. *polonica*, Pruff., *Bull. int. Acad. pol.*, p. 201 (1918-19).

ORIG. DESCRIP.—“The most striking character of the new aberration, which I name *polonica*, lies in the complete absence of the white spots, which in all the rest of the forms of this species, are placed between veins X and V. Otherwise the markings of the forewings shew no great divergence from that of the type, only they appear somewhat more sharply pronounced; on the other hand there is a difference of ground colour in the forewings, for these are not grey-black, but uniformly dark brown with slight black suffusion.

“In the hindwing, the blackish marginal band appears widened towards the wing base, and the ground colour becomes a dark brown, similar in colour to that of the forewing. On the upperside of this wing the white central spot is obsolescent, on the underside it is not evident.

“Of all the known forms of *rumicis* these are the darkest and most melanistic examples.” Olsza, Krakau, Poland. 2 examples only.

ab. *bercei*, Sand. (?), *Fn. France*, vol. III., p. 19 (1870): *Cat. Lep. Auvergne*, 43 (1879).

ORIG. DESCRIP.—“Entirely black and without any apparent design; the two little white spots at the base of the elbowed line are scarcely visible.” Indre, France.

Add to p. (81) after line 7 to *V. alborensa*.

race *tanaica*, Alph., *Hor. Soc. Ent. Ross.*, XXXVIII., 585 (1908).

ORIG. DESCRIP.—“*A. centripuncta* differt alis anticis striga basalis fusca; forma frequentior.” Russia.

ab. *nocmelaina*, Traub., *Int. Ent. Zt.* XXII. 188 (1928).

FIG.—*l.c.*, p. 189.

ORIG. DESCRIP.—“Head and thorax brown-black, forewings almost black, veins pale grey, base of wings grey. Hindwings brown-grey, towards the margin blackened, abdomen brown-black.” Osten in Silesia.

This specimen, with other melanistic examples, was bred from pupae collected in a district which is now foul from its industrial works. Previous to the establishment of the great factories and works the species showed no trace of melanism.

II. Sub-class :—GENUINAE, Gn.

1. Family :—*Leucaniidae*, Gn.

Tutt, in *Brit. Noct.* 1891, placed the two larger genera *Leucania* and *Nonagria* with the smaller genera closely related to each respectively, in one family the *Leucaniidae*. It had been the almost universal arrangement up to that time to place these as one group or family. Curtis, Stephens, Boisduval, Guenée, Doubleday, Standinger, 1871, and South only differed in the relative positions of the component genera. Hübner, *Verz.*, 1825, had placed the two genera next to each other and, in fact, Schiffermüller, *Verz. Wien*, indicated the same close affinity.

Tutt, however in the small book, *Brit. Moths*, 1896, adopted a classification, which had been foreshadowed by his paper in *Trans. Ent. Soc. London*, 1895, in which he correlated the results arrived at by the studies of Dyar, Comstock, Chapman, Hampson and Packard. That portion, with which we are concerned here, is as follows :—

Fam. <i>Noctuidae</i> .	Sub-fam. <i>Caradrininae</i> .	Sub-fam. <i>Apameinae</i> .
Sub-fam. <i>Noctuinae</i> .	Tribe <i>Stilbidi</i> .	Tribe <i>Nonagriidi</i> .
Tribe <i>Leucaniidi</i> .	Tribe <i>Caradrinidi</i> .	etc.
Tribe <i>Agrotidi</i> .	Sub-fam. <i>Amphipyrinae</i> .	

Of the *Leucaniidi*, he says, "The imagines of this tribe are very highly specialised for protective purposes. The various species live principally in damp woods, marshes, or fenny districts and are all pale in colour, agreeing with the colour of the reeds and grass culms on which they rest. Their larvae are grass or reed feeders, and the facies of a 'wainscot,' as these moths are called, is quite unmistakable." The larvae are all external feeders, except *brerilinea*, which naturally does not belong here.

Of the *Apameinae* he says, "This large and comprehensive sub-family has been wonderfully muddled by British authors. Matters have been made still more complicated by the union of one of its groups—the *Nonagriidi*, the members of which live in marshes, and have hence adopted a 'wainscot' facies for the purposes of protection and as a result of natural selection—to the *Leucaniidi*. The larvae are all internal feeders, and appear to have undergone considerable modification to enable them to live in the long, narrow stems of reeds, grasses, etc."

He has transferred *phragmitidis* from the *Leucania* assemblage to that of *Nonagria*, *brerilinea* remains in *Leucania*, *arcuosa* and *bondii* = *morrisii* removed from the *Nonagria* assemblage to the *Stilbidi*, genus *Chortodes*, and *extrema* (?) = *concolor*, remains in *Tapinostola*.

All subsequent authors have recognised the fact that there are two sections, but some have placed them in juxtaposition, while others have widely separated them, most of the former have placed the *Leucania* group first. British and American authors (except South, Barrett and Smith) do this, as also does L'homme, while, the continental authors, except L'homme, and with Smith, Barrett and South, place the *Nonagria* first.

Aurivillius, *Scand. Fjäril*, 1891, puts the *Nonagria* group first followed by the *Leucania*.

Smith, *Cat. Noct. N. Am.*, 1893, does the same.

Meyrick, *Hand.*, 1896, puts the *Leucania* group first and makes two sub-sections of the *Nonagria* which are widely separated from each other. It is difficult to compare a classification based on structure only with those based on natural affinities. However, he removes *musculosa*, *phragmitidis* and *brevilinea* from the *Leucania* group and places them in *Caradrina* (*alsines*, etc.), with species from *Tapinostola*, *Chortodes* and *Calamia*, which genera are suppressed. His *Nonagria* has only *sparganii*, *arundinis*, *geminipuncta*, *dissoluta* (*neurica*) and *cannae*.

Kirby, *Handbook*, 1897, puts the *Leucaninae* group immediately after the *Acronyctinae*; *Leucania*+*Hyphilare* and *Nonagria* next.

Barrett, *Lep. Brit. Is.*, 1899, treats of them together, but puts the *Nonagria* section before the *Leucania* one and takes *arcuosa* away into *Hydrilla* with *palustris*. He places them a long way down the *Triplidae* section of *Noctuina* after *Agrotis*, *Noctua*, *Hadena*, *Dianthoeia*, etc., and *Hydroecia* immediately preceeding.

Staudinger, *Catalog.*, 1901, lists them together, as in Barrett, a long way down the *Triplidae* section with *Nonagria* first and *arcuosa* put in *Petilamp*a adjoining *Hydrilla*.

Dyar, *Cat. N. Am. Lep.*, 1902, places *Leucania*=*Heliophila* (Tent.) first and *Nonagria* much further on separated by many genera including *Taeniocampa*=*Graphiphora* (Tent.) *Nylina*=*Lithophane*, *Calocampa* and *Cucullia*.

Holland, *Moth Book*, 1903, follows Dyar.

Hampson, *Lep. Phal. V.* 1905, dealt with the *Leucania* group in the *Hadeninae* under 6 genera of which the names of 4 were changed from the current ones; *arcuosa* was put under *Petilamp*a with *palustris* in the *Acronyctinae* (l.c., VIII. 1909); and the *Nonagria* group in 6 genera of which the names of 3 were changed from the current ones, in the same subfamily (l.c. IX. 1910).

Spuler, *Schm. Eur.* 1906, follows Staudinger.

South, *Moths Brit. Is. I.* 1907, practically follows Staudinger.

Pierce, *Genitalia Brit. Noct.* p. 26, 1909, says. "The genus *Leucania* is a most unnatural sequence to the *Acronyctia*. After throwing out *brevilinea*, which evidently belongs to the *Hydroecia*, *Leucania* separates naturally into two distinct divisions. I. with rounded battledore harpes: *turca*, *pallens*, *faricolor*, *littoralis*, *vitellina*, *pudorina*, *albipuncta* and *l-album*, and *conigera*, *impura* and *straminea* with the harpes pointed at apex, while *extranea* has a long apical spine on harpes. II. harpes not battledore and with only marginal spines: *putrescens*, *comma* and *obsoleta*. *Flammea* follows in *Meliana*, very closely allied.

The *Nonagria* group of genera immediately follow. "S. *musculosa* should certainly not precede *Leucania*,* with which it has nothing in common." . . . "The grouping is distinctly difficult, mostly leading directly, or indirectly, to *Hydroecia*," in which he puts *lutos*a. He says that "*arcuosa* and *exopolita* undoubtedly belong to this group (*Nonagria*) and possibly the remainder of the *Miana*."

Warren-Seitz, *Pal. Noct. III.* 1911, divides the *Leucania* section of Tutt into two groups, placing one portion in the *Hadeninae* towards the end and the other portion towards the end of the *Amphipygrinae*,

* Barrett puts *musculosa* in *Tapinostola*.

but separated from the former by the whole of the *Cucullinae*. Three species have been removed from their old position into the latter portion. *C. arenosa* has been placed earlier, in *Caradrina* = *Athetis*. The remaining *Leucania* species are divided between *Hyphilare* and *Sideridis*. The *Tapinostola* species become *Arenostola* and the *Nonagria* species *Archana*, the name *Nonagria* being transferred to *maritima*, while *arundinis* becomes *Phragmitiphila typhae*. The arrangement much resembles that of Hampson. It must be remembered that Warren had very large material upon which to base his determinations.

Vorbrodt, *Schn. Schweiz.*, 1911, follows Staudinger generally.

Culot, *Noct. et Geom.*, 1912, etc., places *brevilinea* with *Nonagria*, which is followed by *Orrhodia* and *Dasyampa*. After these come the remaining species concluding with *Leucania*.

L'homme, *Cat. Lep. France*, 1923, closely follows Hampson.

Meyrick, *Revised Handbook, Brit. Lep.* 1928, retains the distribution of the species in the 1896 edition, but reverses the order of the groups, the *Nonagria* group in two subsections precedes the *Leucania* group, the Agrotides and Poliades and most of the Caradrinides intervening. *Leucania* is divided into *Leucania* (sens. strict.) and *Aletia*. As to why these positional changes, no hint is given.

11. Genus: *Synia*, Dup., *Cat.* (1844): *Leucania*, Ochs. (1816): [*Symira*, Hb. (1822)]: *Oria*, Hb. (1822).

The genus *Oria*, Hb., contains only the one species *musculosa*; if *musculosa* be identical with *nervosa*, Schiff., as some have surmised, the genus name would then be *Symira*, Hb. (1822), or *Simyra*, Ochs. (1816).

Synia (Oria) musculosa, Hb.

Haworth, *Lep. Brit.* 176 (1809) identified it with the *nervosa* of Fab., *Ent. Sys. emend.* III(2). 23 (1794), while Fabricius l.c. cites Schiffermüller, *Verz.* p. 85 (1775) as his species.

Stephens, *Ill.* III. 81 (1829), describes *musculosa* and also *nervosa*. Curtis in his annotated copy of the *Ill.* calls the *musculosa* = *phragmitidis* and puts *nervosa* = *musculosa*?

Esper, *Schn. Abb.* IV. plt. 148, *nervosa* is *arundinis (typhae)* and his plt. 130 *oxyptera* is considered to be *nervosa* (1786). It is brown with dark brown veins.

Doubleday considered Stephen's *nervosa* as *musculosa*.

Wood figured *phragmitidis* as *musculosa*.

Treitschke says that Borkhausen's *pudorina*, *Eur. Schn.* IV. 720, is not the species of Schiff. *Verz.* but Hübner's and his own *musculosa*, *Schn. Eur.* V. (2), 286 (1825). He also says that fig. 346 of Engramelle, *Pap. d' Eur.* VI. is a good figure of *musculosa*.

Duponchel says that there is absolutely no resemblance between *musculosa* and the figure 346 of Engram. with which Treit. identifies it.

Herrich-Schäffer says that Hübner's figure of *musculosa* is deficient in shape, marking and colour and no more recognisable as this species than is the description of Treitschke.

Thus it will be seen that considerable confusion existed among the

earlier entomologists as to the form of this species which should be considered as typical, and to us this has been made worse by the inferior figures, made the more so by the deterioration of the colouring by age.

Finally in 1864, Werneberg, *Beitr.*, says that Borkhausen's *pudorina* is *nervosa*, Schiff., that Esper's *oryptera* is *nervosa*, and that Engram. figs. 346 are *musculosa*, and his 367 are *nervosa*.

Tutt *Ent.* XXI. 100 (1888): *Brit. Noct.* I. 29 (1891): Barr. *Lep. Br. Is.* V. 100, plt. 197 (1899): *Stdgr. Cat.* III. ed. 189 (1901): *Splr. Schm. Eur.* I. 219, plt. 42 (1906): *South Moths Brit. I.* I. 302, plt. 146 (1907): *Hamp. Lep. Phal.* IX. 334 (1910): Warr.-Seitz. *Pal. Noct.* III. 239, plt. 48f (1911).

The following is a list of the named forms to be considered:—
musculosa, Hb., *Noct.* 363 (1808).

ab. *flava*, Freyer, *Nou. Beitr.* IV. 142, plt. 370 (1846).

r. *rusa*, Evers., *Bull. Mosc.* III. 79 (1847).

r. *myodea*, Rmbr., *Cat. Lep. And.* plt. 6, fig. 3 (1858).

r. *frumentalis*, Linde., *Bull. Mosc.* (1) 155 (1883).

r. *laeta*, Alph., *Rom. Mem.*, V. 165 (1889).

r. *flavescens*, Hamp., *Lep. Phal.* IX. 335, plt. 144, fig. 27 (1910).

ab. *olivina*, Alphr. (Obthr.), *Lep. comp.* VII. 233, plt. 194, fig. 10 (1913).

ab. *dirini*, Alphr. (Obthr.), *Lep. comp.* VII. 233 (1913).

Tutt considered the typical form and *myodea* (*Brit. Noct.* IV. 93). Of this latter Tutt said, teste Dobrée, that the data of *myodea* rests on one imperfect specimen coming from Andalusia. Hampson, however, reports a ♂ and ♀ from Tangiers in the Leech collection and treats it as a good species.

Duponchel's figure is too definite in its markings, the reniform is particularly prominent as are a series of marginal white markings. It is the other extreme of Newman's figure and much like Hübner's type.

Newman's figure is worthless and his description is hardly any better.

Barrett gives, perhaps, the best figure; the reniform may be of too definite shape and too strongly interrupts the faintly lighter median shade running from base to just below apex.

Spuler's figure is good, but the diverging whitish rays are too much suppressed.

South gives a good figure, but somewhat too yellow.

Warren (Seitz) gives two figures, ♂ and ♀, which are clear and useful with no undue emphasis of any markings. He puts *flava*, *flavescens*, *nervosa* and *frumentalis* as synonyms of *musculosa*.

Hampson's figure (not coloured) is too clear and sharp.

Culot's figure again is too definitely marked.

Warren distinguishes *musculosa* from *myodea* by the ♂ antennae, those of *musculosa* being ciliated, those of the latter have fascicles of cilia.

Rambur's figure of *myodea* is certainly of a form of *musculosa*. The figure in my copy of his work is only slightly the worse for age; no apparent stigmata.

Staudinger, *Cat.* 1901, and Spuler treat *myodea*, Rmbr., as a true species, next to *musculosa* in *Tapinostola*.

ab. *flava*, Fr., *N. Beitr.*, IV. 142 (1846).

FIG.—*l.c.* pl. 370.

ORIG. DESCIP.—“It has the size of *venosa*. Thorax and forewings are of a fawn, or faded yellow, varying to pale brown. The forewings have two white stigmata. The reniform extends in a similar white colour between veins 3 and 4, and shews itself in the upper part between veins 2 and 3 as a strong white spot. From the base there extends, below a dark brown shade, a similar white streak, underneath the middle of the base, and out to the fringes, which last have the colour of the hindwing. All the veins of the fore- and hindwings are brown and very clearly marked. Abdomen and hindwings vary to brown yellow. The underside is the same, on which the reniform stigmata are clearly visible with their extension to the fringes by the white colour. It does not agree either with Hübner's figure, which is a bad one, nor with Treitschke's description of *musculosa*.” He suspects it is *musculosa*, however.

The figure is very yellow.

race *rusa*, Evers., *Bull. Mosc.* III. 79 (1847).

ORIG. DESCIP.—*N. sordide rufo-testacea, ciliis concoloribus, alis anticis puncto medio nigricanti. Fem.*

“A little smaller than *Cerastis vaccinii*, L., which by the colour of the wings and the blackish median band at first sight it suggests, but, on account of the shape of the wings and the exterior series of spots, must be placed with the *Nonagria*.” Volga region.

In his later writings on the Noctuae, Eversman places *rusa* as a form of *camiae*, *Bull. Mosc.* (1855) p. 180.

race *frumentalis*, Lindeman, *Bull. Mosc.* (1) 155 (1883).

ORIG. DESCIP.—12mm. “Body is stout, thickly covered all over with long yellowish white hairs, without comb or crest. Eyes black, not hairy. The forewings pale yellowish scaled, with two white longitudinal lines. The noctuid markings are absent, even the dark powdering of the veins. The hindwings are also yellowish scaled.” Russia.

race *laeta*, Alph. Rom. Mem. V. 165 (1889).

ORIG. DESCIP.—Varietas minor, dilutior, flavescens. “A certain number of individuals collected by M. Groum Grshmailo from Baldjouane, where the insect is found commonly sitting on the underside of the leaves of a *Phlomis*, are somewhat smaller than is the type of southern Russia. Their colour is also of a purer, clearer yellow, without brownish suffusion, and being constant it is only right that this variety, native of Turkestan, should be named.”

Oberthür does not agree with Hamp. in treating *laeta*, Alph., as a syn. of *musculosa*. He says it is smaller than *musculosa*, lighter, more whitish and is a constant form in Turkestan.

race *flavescens*, Hamp., *Lep. Phal.* IX. 335 (1910).

FIG.—*l.c.* pl. 144, fig. 27.

ORIG. DESCIP.—“Head and thorax white tinged with ochreous, the patagia slightly pink; palpi and legs more ochreous; abdomen white tinged with brownish ochreous. Forewing pale yellow, the costal area faintly tinged with pink, the costal edge white; the median nervure, base of veins arising from it and medial part of vein 1 streaked with whitish and irrorated with a few dark scales; traces of an obliquely curved postmedial series of dark points on veins 6 to 1; cilia whitish. Hindwing white faintly tinged with brown and the terminal area with yellow; the underside pale yellow with slight brown irroration.” C. Colony. ♀.

Hampson's figure of *flavescens* does not agree with his description at all. It is darkish ochreous instead of pale yellow, the costal edge is not white, the veins are not white, the hindwing is only whitish at the base, and not ochreous, the terminal area is ochreous and not tinged yellow.

ab. *divini*, Alphr. (Obthr.) *Lép. comp.* VII. 233 (1913).

FIG.—l.c., plt. 194.

ORIG. DESCIP.—“*Alis fulvo ferrugineis, albido signatis.*” No further description is given of the figure.

The ground is of a deep olive and the markings are also intensified, but only slightly by the olivaceous tinge, and there appears to be less marking than usual. No locality.

ab. *olivina*, Alphr. (Obthr.) *Lép. comp.* VII. 233 (1913).

FIG.—l.c., plt. 194, fig. 10.

ORIG. DESCIP.—“*Alis olivaceis, albido-signatis.*” “This has the wings a grey olive, with the usual markings of the type yellowish-white, very clearly expressed. The brush is unfortunately powerless to show the silky lustre which the wings have in nature.” Kertch.

Leucania, Ochs. (1816): *Xanthia*, Hb. (1806): *Sideridis*, Hb. (1822): *Aletia*, Hb. (1822): *vitellina*, Hb.

Placed with *conigera* and *turca* in *Aletia* by Hübner, *Verz.* (1822). Placed in 3rd section of *Xanthia*, Hb. by Ochs. (1816) and Treit. (1825) *Schn. Eur.* Placed in *Sideridis*, Hb. by Hamp. and Warr. (Seitz). Placed by many authors in *Leucania*. Replaced by Meyrick *Brit. Lep.* (1928) in the genus *Aletia*, Hb. with ten other British *Leucania*.

Tutt *Ent.* XXI. 135 (1888): *Brit. Noct.* I. 29 (1891): Barr. *Lep. Br. I.* V. 168, plt. 204 (1896): Stdgr. *Cat.* IIIed. 193 (1901): Hamp. *Lep. Ph.* V. 440 (1905): Splr. *Schn. Eur.* I. 226, plt. 43 (1906): South *Moths Br. Is.* I. 311, plt. 149 (1907): Warr-Seitz. *Pal. Gr.-Schn.* III. 97, plt. 23i (1909).

My copy of Hb. has fig. 589 with some (not all) markings indistinct, the rest are normally distinct. The figures of Ernst. and Ingram. *Pap. d'Eur.* VII., plt. 298 (1790), probably the first coloured figures, are excellent. Meyrick says *Brit. Lep.* (1928) “now not uncommon.”

Of the variation Barrett says “Not very variable; but the ground colour varies from pale ochreous to rich ochreous yellow and pale yellow; the colour of the slender lines and nervures becoming more rusty red or browner accordingly.”

The forms to consider are:—

vitellina, Hb., *Samml. Noct.* 379, (1808), 589 (1818).

ab. *bogdanovi*, Ersch., *Fedtsch.-Reise.* 45 (1874).

ab. *pallida*, Warr.-Seitz, *Pal. Noct.* III. 97 (1909).

In the Dobrée collection there is a specimen, "Central area of the forewings slightly darker than the other portions, thus producing the effect of a pale band between the second and subterminal lines." p. 14. This may possibly be the form *bogdanovi*, Ersch.

ab. *bogdanovi*, Ersch., *Fedtsch. Reise.* 45 (1874).

ORIG. DESCIP.—"Alis pallide flavis, anterioribus strigis duabus, umbra transversa media spatique inter maculas ordinarias pallidissimas ferrugineis obsoletis. Ab una ♀ descripta." Cocandia, Turkestan.

The author compares it with *vitellina*.

Warren (Seitz) says "in appearance resembling a *Leucania*, to which genus it was originally referred," and places it in *Eucroa* (*Agrotis*) near *puta*.

ab. *pallida*, Warr.-Seitz, *Pal. Noct.* III. 97.

FIG.—l.c. pl. 23i.

ORIG. DESCIP.—"The pale, less highly coloured, specimens with whiter hindwings, which seem to be comparatively rare in Western Europe, though occurring in Switzerland and the Canaries, are the usual form in Syria and Turkestan."

Leucania, Ochs. (1816): *Mythimna*, Ochs. (1816): *Sideridis*, Hb. (1822): *Aletia*, Hb. (1822): *Chabuata*, Walk. (1857): *conigera*, Schiff.

Placed in *Mythimna* with *turca*, *lithargyria*, *albipuncta*, etc., by Ochs. (1816) and Treit (1825): Placed in *Aletia* by Hb. (1822): Placed in *Sideridis*, Hb., by Hamps. and Warr.-Seitz: Replaced by Meyrick in *Aletia*, Hb., *Brit. Lep.* (1928): Placed by many authors in *Leucania*, Ochs. (Treit.).

Tutt gave Fabricius as the author. His description was the first displayed one. The older authors agree in referring *conigera* to Schiff. *Verz.* p. 84, viz., *Fab. Mant. Ent. Sys. aug.*, Bork. *Schm.*, Panz. *Fn. Germ.*, Illig. *Verz. neu.-ausg.*, Treit. *Schm. Eur.*, Steph. *Ill.*

Tutt *Brit. Noct.* I. 30 (1891): *Ent.* XXI. 101 (1888): *Barr. Lep. Br.* I. V. 171, pl. 205 (1899): *Stdgr. Cat.* IIIed. 193 (1901): *Hamp. Lep. Phal.* V. 266 (1905): *Splr. Schm. Eur.* I. 227, pl. 43 (1906): *South Moths Br.* I. I. 313, pl. 150 (1907): Warr.-Seitz. *Pal. Noct.* III. 96, pl. 23g. (1910).

Esper's figure of *floccida* is a bad one of *conigera*, he states that the nearest is Hübner's figure in the *Beitr. Gesch. Schm.*, pt. IV. 31, pl. IV., fig. Z, to which the name in the *Verz.* of Schiff. is given, viz., *conigera*, p. 84. "The white-marked yellow-red noctua," placed between *turca* and *albipuncta*. (The white spot in Esper's figure is probably more or less disfigured.) But the figure is a poor one in colour and pattern, and does not agree with the description not having the white markings mentioned in the text. (*Abbild.* IV, p. 332, pl. 123.

The forms to be dealt with are :—

conigera, Schiff., *Verz.* 84 (1775).

(*floccida*), Esp., *Abbild.* IV. 322, plt. 123 (1788).

subsp. *angulifera*, Moore, *Pr.Z.S.* 33 (1881).

ab. *suffusa*, Tutt, *Brit. Noct.* I. 30 (1891). *Ent.* XXI. 101 (1888).

ab. *intermedia*, Tutt, *l.c.*

ab. *flavipunctum*, Tutt, *l.c.*

ab. *obscura*. Hoffm. and Kloss., *Schn. Stierm.* II. 111 (1916).

Tutt treats of (1) *conigera*; (2) *intermedia*, less melanic and redder ground; and (3) *flavipunctum* with reddish ground and yellow discoidal.

Of the variation Barrett says "Very constant in markings, but variable in colour from pale brownish-ochreous to dark tawny."

In the Dobrée collection there is a specimen, "ground colour bright green," and another "ground colour bright reddish-brown." Both from Germany, p. 18. Engramelle, *Pap. d'Eur.* VII., plt. 291, figures a pale form and Duponchel an unusually dark one.

Sub-species *angulifera*, Moore, *Proc. Zool. Soc.* 333 (1889).

ORIG. DESCRIP.—"Allied to *conigera*. Forewing ochreous-yellow, indistinctly clouded with red ochreous scales; crossed by a reddish-black antemedian outwardly bent line and an oblique postmedian line, which is bent inwards at costal end; a whitish spot at lower end of cell, a pale yellow reniform and orbicular space; marginal and ciliary lines black-speckled: hindwings pale dusky-brown, cilia pale yellow. Thorax, head, palpi and legs ochreous yellow: abdomen paler." N.W. Himalaya, Kashmir.

Stdgr. puts *angulifera*, Moore, as a synonym of *conigera*.

Hamps. treats *angulifera* as a good sp., *M. of Ind.* II. and *Lep. Ph.* V.: ditto C. and Swin. *Cat.* His figure is larger than *conigera*, a rich ochreous colour, reniform not white at base, otherwise it has all the characteristics of *conigera*, especially the angled line and the cloud around the reniform and between the stigmata. Cotes and Swinhoe say "allied to *conigera*."

ab. ♀ *obscura*, Hoffm. and Kloss., *Schn. Stierm.* II. 111 (1916).

ORIG. DESCRIP.—"Among my specimens from Krieglach is found a very dark female, which is dark brown and similar to a dark *Leucania albipuncta*. I name this from *obscura*."

Leucania, Ochs. (1816): *Mythimna*, Ochs. (1816): *Aletia*, Hb. (1822): *Hyphilare*, Hb. (1822): *Sideridis*, Hb. (1822): *albipuncta*, Schiff. (Fab.).

Placed in *Hyphilare* with *lithargyria* by Hb. in 1822 *Verz.* Placed in *Aletia* by Meyrick in *Brit. Lep.* (1928).

With this species, again Tutt gave the first displayed description, that of Fabricius in the *Mantissa*. All the earlier authors recognise it as the *albipuncta* of Schiff. *Verz.* 84 (1775), who must be cited as the author. It was bred from a larva on *Plantago major*.

Tutt *Brit. Noct.* I. 30 (1891): Barr. *Lep. Br.* I. V. 173, plt. 205 (1899): Stdgr. *Cat.* III ed. 193 (1901): Hamp. *Lep. Ph.* V. 438, fig.

121 (1905): Splr. *Schn. Eur.* I. 227, pl. 43 (1906): South *M.B.I.* I. 312, pl. 149 (1907): Warr. (Seitz) *Pal. Noct.* III. 95, pl. 23de (1910).

The following are the forms to be dealt with:—

albipuncta, Schiff., *Verz.* 84 (1775).

ab. *italo-gallica*, Mill. (1872).

ab. *rufa*, Tutt, *Brit. Noct.* I. 31 (1891).

ab. *suffusa*, Tutt, *l.c.*

ab. *grisea*, Tutt, *l.c.*

ab. *flecki*, Carad., *Iris.* IX. 31 (1896).

ab. *fasciata*, Splr., *Schn. Eur.* I. 227 (1906).

ab. *ochracea*, Warr (Seitz), *Pal. Noct.* III. 95 (1910).

ab. *expallidata*, Warr (Seitz), *l.c.*

subsp. *rufotincta*, Wagn., *Verh. z.-b.* LXX(42). (1920).

There seems little doubt that early entomologists mixed this species with *lithargyria*.

Esper's figure 5 on pl. 124 of *Abbild.* IV., with a white point, called *lithargyria* may be taken to be *albipuncta*. Vieweg, *Tab. Verz.* II. 59, figures a red form with a well-marked reniform as *lithargyria*, but his description appears to be that of *albipuncta*. Laspeyres, *Illig. Mag.* II. 115, says that Bork., View., and Fab. describe *albipuncta*, but not Esper as some think. Stephens appears to have called his one example *lithargyria*, but the white point and the rarity would point to *albipuncta*, while his *grisea* with dotted hind margin is probably *lithargyria*. Hampson, on the other hand treats both Stephen's species as *lithargyria*, and treats the grey form as ab. *grisea*.

Ernst and Engram., *Pap. d'Eur.* VII. 129, pl. 294, give 5 figures (2 underside) a rich red one, a reddish brown one, and a grey one with only a suspicion of red brown.

Barrett, curiously, says "apparently not variable."

In a short series from Moux in S. France, kindly given me by Mr. Wm. Fassnidge, there are two specimens in which the usually almost suppressed markings are emphasised, while the ground has become pale rufous.

Tutt treated with the deep red form, *rufa*, the form suffused with dark scales, *suffusa*, and the grey without the reddish tinge, *grisea*.

ab. *italo-gallica*, Mill., *Cat. Rais. Lep. Alpes-Mar.* 2nd Sup. 21 (1872).

ORIG. DESCIP.—Variety "qui a passé au brun plus ou moins obscur." Cannes, May.

ab. *flecki*, Carad., *Iris.* IX. 31 (1896).

ORIG. DESCIP.—"In the height of summer and autumn at Grunazesti, Rumania, in numbers at light. This common species takes constantly in all its known localities two very different forms, one of which a more or less bright reddish form as figured by Hoffmann, *Gross.-Schn. Eur.* II. pl. 43, f. 24, and which is given as the typical form, and a variety somewhat smaller, measuring only 32 to 33mm. The latter has dark grey-brown forewings, and tolerably dark-grey hindwings. This form differs from the usual *albipuncta* so much, that I think it deserves a name."

CORRIGENDA.

Amorpha was accidentally omitted from the list of the Tentamen genera on p. 7 (*ante*) where this genus should follow *Manduca* thus:

Tentamen.	Verzeichniss.
IV. AMORPHAE = St. V. SMERINTHI... 141	
	Fam. A. <i>DENTATI</i> ... 141
	Coit. 2. POLYPTYCHI ... 141
[<i>i.e.</i> , AMORPHA Hb. (1805). <i>i.e.</i> , POLYPTYCHUS Hb. (1822)]	
	1514 <i>Polyptychus dentatus</i> Cram.
	1515 „ <i>timesius</i> Stoll.
	1516 „ <i>juglandis</i> Abb.
1 (type) <i>Amorpha populi</i> = 1517	„ <i>populi</i> . L. (Hb. 74).
	1518 „ <i>quercus</i> Schiff. (Hb. 71, 118).

p. 16 top line “1701 *sublustrus*”—this was corrected to *sublustris* as printed by Hübner.

SAMMLUNG EUROPÄISCHER SCHMETTERLINGE PLATES.

1.—PAPILIONES.

Plates.	Figures.	Date.
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89-96	447-490	(1802)
97-114	491-588	(1804)
115-124	589-636	(1805)
125-128	637-652	(1808)
129-147	653-741	(1808-16)
148-150	742-756	(1817)
151-154	757-774	(1818-22)
155-161	775-806	(1823)
162-195	807-968	(1823-33)
196	969-974	(1834)
197-207	975-1029	(1834-41)

2.—SPHINGES.

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17	79-84	(1799)
18-23	85-112	(1802-8)
24-30	113-140	(1808-18)
31-34	141-155	(1818-22)
35	156-160	(1827)
36	161-164	(1828)
37-38	165-173	(1840)

3.—BOMBYCES.

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60-63	255-268	(1810-18)
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67	282	(1823)
68-69	283-294	(1823-7)
70	295-298	(1827)
71-74	299-314	(1828)
75-76	315-322	(1829)
77-80	323-340	(1831)
81-83	341-355	(1834-41)

4.—NOCTUAE.

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75-86	346-405	(1802-8)
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95-139	446-638	(1808-18)
140-150	639-697	(1818-22)
151	698-703	(1823)
152-169	704-802	(1826-33)
170-176	803-839	(1834)
177-185	840-882	(1834-41)

5.—GEOMETRAE.

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96-100	493-519	(1818-22)
101-102	520-531	(1827)
103-105	532-549	(1828)
106-108	550-568	(1828-33)
109-111	569-585	(1834)
112-118	586-596	(1834-41)

6.—PYRALIDES.

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22-23	142-154	(1800-11)
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28-29	177-186	(1818-22)
30	187-192	(1823)
31	193-200	(1832)
32	201-207	(1834)

7.—TORTRICES.

1-29	1-187	(1797)
30	188-184	(1799)

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VERZEICHNISS, BEKANNTER, SCHMETTERLINGE.

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6-10	81-160	820-1670	[1820]		
11-15	161-240	1671-2388	[1822]		
16-19	241-304	2389-2936	(1825)		(1825)
20-27	305-432	2937-4198	(1826)	3 2	(1826-7)
1-9	1-72	ANZEIGER	(1827)		

In the three periods indicated three different founts of type were used—these founts are most easily recognisable by the figures 333 and 22.

SPECIAL INDEX.

By H. J. TURNER, F.E.S.

VOL. XL. (new series) (1928.)

The Entomologist's Record & Journal of Variation.

Coleoptera arranged in order of Genera. The other orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

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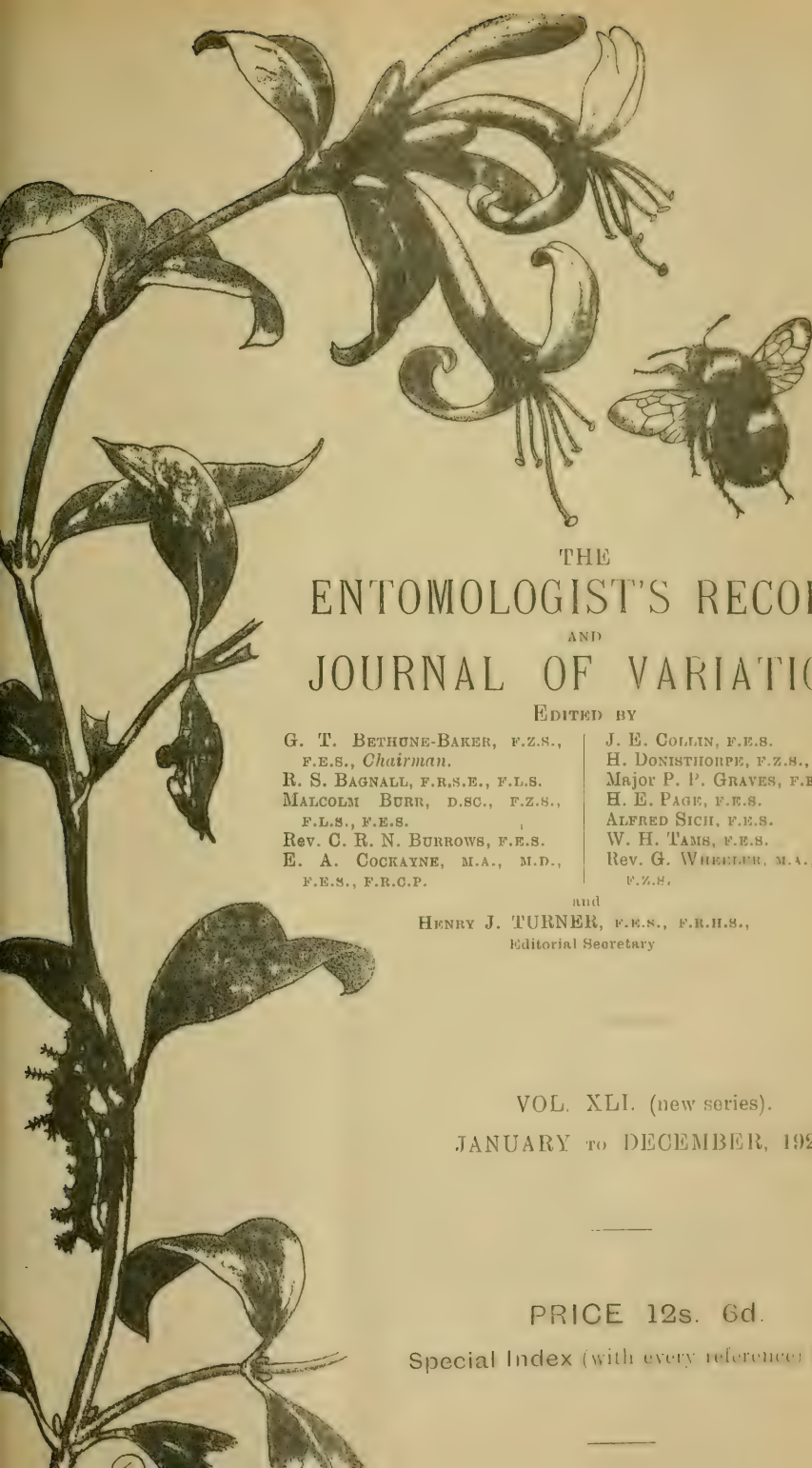
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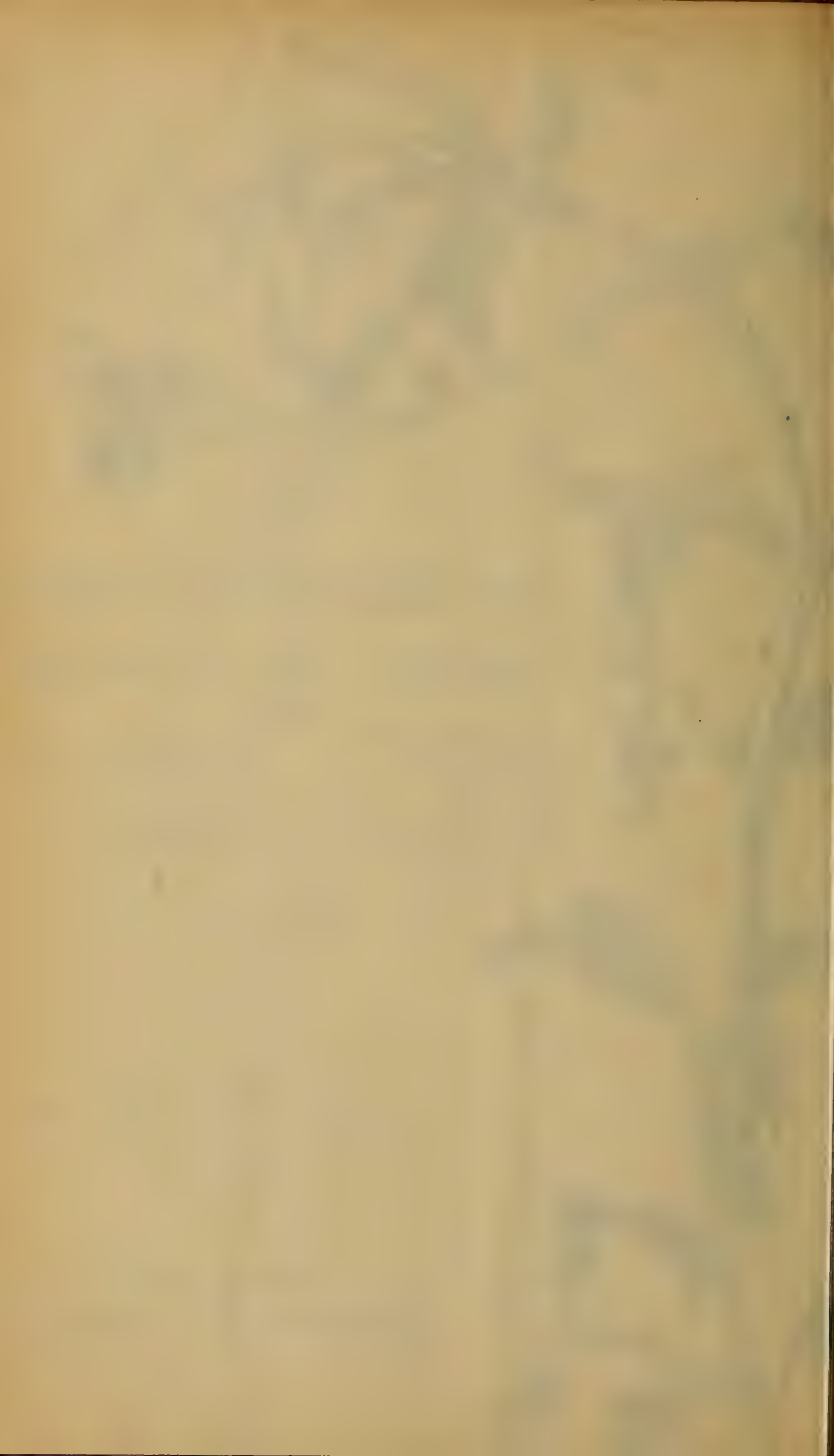
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JANUARY 15TH, 1929.

Easter 1926, 1927 and 1928 in the South of France—Lepidoptera.

By Wm. FASSNIDGE, M.A., F.E.S.

It is rather surprising that so few entomologists nowadays publish any account of their visits to the South of France, more especially when one considers how rich this region is in early Spring, and how delightful it is to bask in glorious sunshine after the average English winter. And those who do write of their captures, seem rarely to be interested in anything save the Rhopalocera, so that these notes of three Easter Holidays spent with my wife in the department of the Var, may perhaps encourage others to spend a few weeks in this lovely part of France, and to publish some account of their entomological experiences.

Each year, from 1926 to 1928, the Easter holidays allowed about three weeks in April at the centre chosen, at Cavalaire in 1926, at Carnoules in 1927, and at Bormes-les-Mimosas in 1928. Reference to the map will show the exact position of these three villages.

CAVALAIRE is situated on the bay of the same name about half way between Hyères and St. Raphaël. In 1926 it was a delightful place with a fine stretch of sandy beach, and tangled forests on all the hills around—alas, the disastrous forest fires of 1927 have wrought sad havoc here, and the whole broad stretch of forest to the west of Cavalaire from the sea to far beyond the railway line is now a desolate and blackened waste.

CARNOULES is a typical Provençal village some twenty-five kilometres nearly due north of Hyères. It lies on the main P.L.M. line from Toulon to Nice, where the railway makes a wide sweep inland to the north of the mountains of the Maures. To the south of the valley through which the railway runs are vast forests of cork-oak, tree heather and pine, but to the north lie the thyme-clad hills of Provence, at their loveliest in April. Two distinct regions with very different flowers and insects are separated by the valley, so that Carnoules is a most interesting station from a botanical or entomological point of view.

BORMES-LES-MIMOSAS nestles half way up the hillside, four kilometres inland from the bay of Le Lavandou and twenty-four kilometres east

of Hyères. Behind rise the mountains of the Maures, reaching to about 2,000 feet, whence one may get glorious views of the far distant Alps and no less wonderful views of the Mediterranean and the "Isles of Gold." The hills are thickly covered with forest or scrub, and there are great beds of the giant reed used for basket making in the lowlands nearer to the sea.

As was only to be expected, our experience varied very considerably in these three different localities, in three different seasons, of which the last can safely be called a very backward one.

From a holiday point of view, it would be difficult to find a more pleasant spot than Cavalaire in April; its beach is the finest in that part of the Côte d'Azur, hotel accommodation is excellent at a moderate price, hunting grounds are easy of access, and best of all, the cork oaks and posts beside the railway line, quite close to the Hôtel de la Plage, made an excellent sugaring ground. Along the railway line in either direction, in the broad clearing cut through the forest as a protection from fire, *Polyommatus hispana*, H.-S., occurs at intervals. This is the double-brooded insect long confused with *P. coridon*, Poda, and separated by Dr. Reverdin, who took specimens at Pardigon, a mile or so to the east of Cavalaire. Only males were seen early in April, but later in the month females were also taken, and the species became fairly common. Near the end of our stay, on the 21st and 22nd April, when the weather turned dull and cold, we spent two afternoons crawling about on the railway bank beyond Pardigon, searching for pupae of *P. hispana* under stones. About thirty were found, and five larvae, of which latter four soon changed to pupae. Only a few butterflies were bred from these pupae however, for many of them produced parasites. Nearly all these pupae and larvae were found among small colonies of ants, but a few of them were quite unaccompanied by ants. Only three empty pupa cases were found at this date, though considerable numbers of the insect had been seen. In 1928 we revisited this spot from Bormes in order to take a few males for a friend, but only four specimens were seen on the wing during the whole day, and not a single pupa or larva was found in the two hours devoted to searching for them. Along the line towards Pardigon is the especial haunt of *Gonepteryx cleopatra*, L., which I have never found so easy to catch as here, where it flew in 1926 in large numbers, though it was very scarce in 1928. *Thais hypermnestra*, Scop., is not uncommon here, and *Libythea celtis*, Fuessl., sometimes flies freely around the tamarisk bushes in bloom, and is then fairly easy to net. Between Cavalaire and Pardigon the railway runs close to the beach, which is fringed with tamarisks. Here nearly every day at about 5 p.m. we found from six to twelve specimens of *Clytie illinaris*, Hb., drying their wings, sitting on the inside of the rails. This rare and variable Noctuid, which feeds on the tamarisk, seems to be very fragile, easily rubbed, and very liable to emerge crippled. Not more than half of those we found newly emerged were in good enough condition to set. Everywhere almost around Cavalaire the arbutus grows in profusion, and no doubt *Charaxes jasius*, L., is common enough in some seasons. I succeeded only in finding one hibernaculum, empty of course, but we heard of larvae taken and of insects observed on the wing, not of course in April. We were even less successful at Cavalaire in the search for *Callophrys avis*, Chpmn., where C.

rubi, L., occurred in vast numbers. Our botanical knowledge was insufficient to enable us to find the only foodplant of *C. aris* we then knew of, *Coriaria myrtifolia*, L., if indeed it occurs on this part of the littoral, and we were not then aware that the insect feeds on *Arbutus unedo*, L., in this district at any rate. Armed with this knowledge, we had no great difficulty in finding *C. aris*, near Bormes, of which more in due place. Much time was devoted to searching the cork oaks for cocoons of *Hoplitis milhauseri*, Fb. Large numbers of empty cocoons were found at Cavalaire and at Bormes, but very few at Carnoules. Of the few cocoons found intact, one only, found near Bormes, contained a living pupa, and from this a male moth was bred on April 19th, which unfortunately got rubbed before it could be killed. All the time spent in this way was not wasted, for many insects were found at rest, and some cocoons of other species, from which were bred among other things two *Catephia alchymista*, Schiff., and one crippled *Grammodes geometrica*, Fb. Moreover so far as my personal experience goes, I am able to say quite definitely that the vast majority of cocoons are to be found on the south side of the trunk, at heights varying from four to eight feet, and that it is excessively rare to find a cocoon on the under side of a horizontal bough, which is said to be the favoured situation.

On all three trips we went fully equipped for sugaring, but only at Cavalaire could a suitable ground be found. Here we sugared some forty trees, mainly cork oaks, along the line close by the station. Insects were never very abundant, but always interesting. *Pseudophia lunaris*, Schiff., came in numbers and often disturbed other visitors to the sugar. *C. alchymista*, *Calocampa vetusta*, Hb., *Leucania l-album*, L., *Acrionia auricoma*, Fb., and *Arna tirhaca*, Cr., came sparingly, while *Conistra staudingeri*, Gras., in the most surprising variety, was a frequent visitor. At Carnoules no suitable sugaring ground could be found within a reasonable distance, and at Bormes the sugar attracted such large numbers of millipedes that no moth could find room at the feast. Nearly all the insects that came to sugar were very skittish and rarely stayed very long. A good series of *C. alchymista* was taken by searching one dull morning along the railway line. The insect sits just under the projecting top of the rail, with its head in the darkest place, and is very difficult to see, besides being very restless when boxed.

At no place were there any electric lights that could conveniently be worked, so that very few insects were taken at light. At Cavalaire a huge female *Dendrolimus pini*, L., came to the station lamp, together with a few *Chesias rufata*, Fb., very different in colour from our Hampshire specimens, and *Pygaera curtula*, L.; at Carnoules the chief capture was *Saturnia pyri*, Schiff.; at Bormes, where conditions were less unfavourable, we took among other things *Biston hirtarius*, Cl., males only, *C. staudingeri*, *P. lunaris*, *Myelois obliqua*, Zell., *Boarmia cinctaria*, Schiff. It is certain however, that a strong light and a sheet would yield good results, and suitable spots for hunting by this method abound in all localities.

Carnoules, although not very far distant from Cavalaire, is quite a different type of locality. The best hunting grounds lie to the north, in the valleys of the thyme-covered hills. Early in April, males of *Anthocharis euphenoides*, Stgr., were flying there, and later in the month females were also plentiful. *Turanana baton*, Berg., *Glaucopsyche cyllarus*, Rott., and *G. melanops*, Boisd., were quite abundant,

the two last named showing considerable variation in the underside and in the upperside of the females. *Thais rumina*, var. *medesicaste*, Ill., was moderately common, and somewhat variable, while *Papilio podalirius*, L., was especially abundant around the cherry trees in bloom. Not being aware that *Thestor ballus*, Fb., occurred so far from Hyères and the littoral, we were agreeably surprised to find it here in large numbers; it was in fact so numerous as to be almost a nuisance. Early in April it was in perfect condition, and good females were seen three weeks later. It haunts especially the olive groves in the dry stony valleys and the lower hill slopes, where it flits over low plants and flies out pugnaciously at other insects passing near. On the same ground may be taken occasional specimens of *Lithostegia farinata*, Hufn., disturbed from the scant herbage. Higher up the hill sides in open places among the bush is the favourite haunt of *Thais rumina* var. *medesicaste*, and it was in one of these small clearings, whilst I waited net in hand, that a huge wild boar burst suddenly through the thicket and checked himself at sight of me with a start of fear almost as great as my own. *Anthocharis crameri*, Butl., was most abundant here, and large numbers of ova and larvae were found on the flowers of *Biscutella*, where females were often seen ovipositing. The Neuropteran, *Ascalaphus coecajus*, was also very abundant, but though we watched their graceful evolutions for many hours, we never saw a lepidopterous insect captured; the chief prey appeared to be diptera and possibly small coleoptera. Antlions should be abundant later in the year judging from the number of pits and larvae seen in all sorts of situations; at Cavalaire quite close to the sea in wind-blown sand, at Carnoules in the red sandy soil of slopes facing south, at Bormes in the forest under the shelter of projecting boulders, etc. Up to the present date, we have not succeeded in rearing any single species, though larvae have been kept alive in one case for two years. Three species of *Zygaenidae* were taken at Carnoules and all were difficult to capture, namely: *Z. lavandulae*, Esp., *Z. sarpedon*, Hb., and *Z. rhadamanthus*, Esp.

Our holiday at Bormes was, by comparison and speaking entomologically, a failure. For this there were two good reasons, bad weather and a backward season. Heavy rain fell for the first two days of our stay and all three Sundays were rainy. The inhabitants complained bitterly of the unfavourable season, saying that it was the worst since 1895, when orange and lemon trees were killed by frosts. This part of the littoral is the favourite habitat of that lovely plant *Asphodelus microcarpus*, Viv., which grows here in extensive beds by streams and ditches and in damp places in the forests, while it is more scattered and rare elsewhere in France. In the last year's dry stems a fine longhorn beetle, *Agapanthia asphodeli*, Latr., was found not uncommonly, and a few specimens were also taken already emerged sitting on the flowers and leaves. Larvae and pupae of *Tortrix unicolorana*, Dup., were fairly common in spun together leaves in several localities, and before mid-April the moth itself was taken among the asphodel. An insect we especially wished to take was *Epagoge hyerana*, Mill., of which the late Dr. Chapman wrote so delightfully in the *Record*. At first we confused the larvae of *T. unicolorana* with those of *E. hyerana*, but we soon found that the latter fed always among the flowers and never spun two leaves together. Frequently too, it bores into the stem at the

flower spike and eats out the interior of the stalk for a distance of three or four inches. Its life-history too is quite different, for the larvae brought home aestivated, changed to pupae some time in September, and the moths emerged at the very end of that month and in October. We only succeeded in breeding four males and one female, but another time we shall know better how to treat these larvae. Spun up in the terminal leaf cluster of various species of spurge, and often boring into the stem, were found larvae of *Nephopteryx discisella*, Dup., easily discovered by the withered brown tips of shoots that had been tenanted earlier in the larval existence. Sometimes several larvae were found in a single shoot, but usually only one was present.

The only butterflies that were really common at Bormes were *Callophrys rubi*, L., and *Thais hypermnestra*, Scop. We were too early for the Hesperids and got only a single specimen of *Hesperia onopordi*, Rbr., on the last day of our stay. The most interesting butterfly was *Callophrys aris*, Chpmn., which occurred throughout the district wherever the arbutus grew. In the lovely Forêt du Dom, it was not uncommon but difficult to catch among the large numbers of *C. rubi*. We found very little difficulty in distinguishing it when settled, and even on the wing its bright fulvous coloration and larger size make it easy enough for an experienced eye to detect it. On hot sunny afternoons this species is easily taken, for then it comes freely to the flowers of *Lavandula staechas*, L.—as also does *C. rubi*—and can readily be netted. Along the railway between Bormes and La Londe there are many good spots for *C. aris*, where on a sunny afternoon, one might take a good series with very little trouble, as we did.

During our stay at Bormes the prevailing winds were from the south and the south-east, and this may account for the fact that many immigrant species were met with, the advance guard of the host, whose stragglers reached England later in the season. *Pyrameis cardui*, L., flew everywhere in condition varying from perfect to rags; larvae in all stages and pupae of *Vanessa atalanta*, L., were found and the butterfly itself was frequently seen; *Plusia gamma*, L., suddenly appeared in countless numbers, and so did *Heliothis peltigera*, Schiff., a week or so later; *Phlyctaenia ferrugalis*, Hb., and *Nomophila noctuella*, Schiff., were so very plentiful as to be a pest; *Ophiusa lunaris*, Schiff., was very abundant for a few days only and then grew much less common: three *Eublemma ostrinalis*, Hb., in perfect condition were found on the sea shore or near; the only dragon fly caught of numbers seen proves to be a well-known immigrant species from northern Africa; and the appearance of nearly all these species coincided roughly with the arrival of the nightingale, the corncrake and the little owl among other migrant birds.

Searching after dark for larvae is perhaps one of the most prolific methods of collecting at this season of the year in any good locality in southern France. Large numbers of larvae of *Euprepia pulica*, Esp., may easily be collected; the larvae of *Satyrus circe*, Fb., *S. hermione*, L., *Melanargia galathea* var., *procius*, Herbst., *Epinephelus jurtina*, L., *Leucania vitellina*, Hb., *L. congrua*, Hb., may be taken, and all except the two Satyrids are not difficult to rear. More rarely we found larvae of *Melanargia syllius*, Herbst., and of *Rhypparia purpurata*, L. Beating and searching for larvae by day was not very profitable, probably owing to the innumerable ants and lizards, which force them to seek a safe

retreat. However, we beat from sloe larvae of *Strymon acaciae*, Fb., and from cork-oak larvae of *Drepana binaria*, Hufn., which gave the very large southern French form. In the cones of *Pinus halipensis*, we found larvae of *Hyphantidium conicolellum*, Const., of *Rhodophaea marmorea*, Haw., on sloe, and a few *Sciapteron tabaniformis*, Rott., in young shoots of poplar, but these latter we failed to breed. Unfortunately it is not easy to bring home large numbers of larvae, and it is best therefore not to attempt to crowd in more than can safely bear the journey. We find that they travel well if placed with a good supply of the foodplant in separate linen bags, loosely packed in well ventilated biscuit tins. As it is not possible to find fresh food in Paris where one breaks the journey home, we usually pack the tins in the heavy baggage; the larvae stand the two days' journey just as well and the loss is usually confined to those that happen to be in the act of pupating at the time.

Like all those entomologists who collect lepidoptera abroad, we have been greatly perplexed as to the best method of dealing with the insects captured. If one is interested in butterflies only, the simplest method is to paper everything, to travel light, and to move about from place to place as fancy dictates. This seems to be the plan usually adopted, but nobody has yet succeeded perfectly in relaxing and setting papered specimens of many species of *Lycaenidae*, and nobody has attempted to deal with Noctuae and "micros" in this manner. For these there is but one way—to set up on the spot just as one would do at home. This means that much baggage must be taken, and that hunting for localities must be cut down to the limits of what can be undertaken in a single day's excursion from the centre chosen. Even so it is of course impossible in a short three weeks to do more than gain a vague idea of the lepidopterous fauna of these rich localities; but at least one has the satisfaction of bringing home, well set and in good condition, the insects for which so much time and trouble have been spent.

(To be concluded.)

Collecting, 1928.

By B. D. H. KETTLEWELL, F.E.S.

I have overheard recently a good many of our older Lepidopterists complain that this season except for migrants has been below the average in the production of interesting species, and it is partly this which has encouraged me to give below a brief summary of my season's captures, which to me at any rate seems up to a good average year.

This for me as far as English collecting was concerned opened about April 18th and my first eight weeks were confined to the Cambridge district. On May 6th a visit was paid to some of the smaller Huntingdon woods. *Strymon pruni* larvae were exceedingly scarce, and only one fell my way for several hours beating, in contrast to last year when it was fairly common. Small larvae of *Ruralis betulae* and *S. quercus* were also beaten (common), and my friend Mr. Worsley Wood beat a good number of *Trichinra crataegi*, also larvae of *Asteroscopus sphinx*, *Diloba caeruleocephala* and *Miselia oxyacanthae* some

producing *ab.capucina* (all common). On the same day also I was very interested to find the larvae of *Cirrhoedia aerampelina* as it had not been observed in the district for some years. It was extremely common under the moss growing over the cut surface of stumps at the foot of living ash trees (nine from one tree). During the following weeks (up to the 19th May) the local elms were beaten and larvae of *Xanthia gilvago* and *Anathes circellaris* were found commonly, the former being pre-eminent, strangely—on the 19th larva of *Strymon ic-album* (1), *Calymnia pyralina*, *Cosmia affinis*, *C. difinis*, *A. sphinx*, *Poecilocampa populi*, etc., were beaten and on the same day the first specimen of *Papilio machaon* appeared, but it was not well on the wing at Wicken till the later weeks of the month and was then common.

On May 26th the Cambridge Natural History Society with representatives of the Oxford Entomological Society had an expedition to Wicken. *P. machaon* was on the wing with numbers of *Saturnia pavonia*. Larvae of *Eutricha quercifolia* were fairly common on buckthorn, and on purging buckthorn larvae of *Philereme rhannata* and *P. retulata* swarmed.

On June 3rd my friend Mr. R. P. Demuth and I went over to some of the Oundle district woods. At the first wood, where *Cyclopides palaemon* had been common last year, only a few were observed and in their place we found a small army of local men and children armed with nets after the few remaining ones. In a wood a few miles away we found it quite common on the same day. On June 8th another expedition was made to the same wood, it was still quite common and on the same day larvae of *Agriopsis aprilina*, *Drymonia chaonia*, and *Cleoceris viminalis* were beaten.

From June 11th-14th I was in the Wicken-Breckland district. So far as day work was concerned, at the former place *P. machaon* was still about, *Bankia argentula* and *Hydrelia uncula* were on the wing, full fed larvae of *E. quercifolia*, frequent, and larvae and pupae of *Synanthedon myopiformis* common in Wicken village. Day time in Breckland produced *Agrophila trabealis* (*sulphuralis*) common, *Leptomeris rubiginata* (a few worn females), *Lithostege griseata* mostly females, one of which laid freely in a chip-box, and *Heliothis dipsacea* more often seen than caught. All these occurred together in the same acre of ground. A little further away after two hours crawl from plant to plant I took an egg of *Dianthoecia irregularis*. Night work varied from night to night; the 11th was bad but the 12th proved to be one of the traditional Wicken nights, a thing which I had not before experienced. *Smerinthus ocellatus*, *Amorpha populi* and *Sphinx ligustri* boomed against the sheet, while such species as *Spilosoma menthastri* and *Meliana flammea* swarmed—and the following turned up: *Noctua castanea*, *Pterostoma palpina*, *Cidaria lignata* (*vittata*), *Spilosoma urticae* and *S. lubricipeda*, few species but in great numbers.

The following night (13th) we (Demuth and I) took at the head lights of the car in Breckland the following species commencing at 1 a.m. after the earlier part of the night had been spent at Wicken:—*Chariclea umbra*, *Mamestra albicollis*, *M. abjecta*, *M. sordida*, *Necuria reticulata*, *Xylophasia sublustris*, *Notodonta trepida* (male), *N. camelina*, *Hecatera serena*, *Dianthoecia cucubali* and *D. carpophaga* (almost white forms), *Mamestra nana* (*dentina*), *L. griseata*, and others.

On June 17th, I was in London and Dr. Cockayne took me over to the Esher District where we were joined by Mr. Williams and we took *Erastria fasciana* (a few on tree trunks), *Chloroclystis coronata*, *Hydrelia uncula*, *Boarmia punctulata*, also larvae of *Nonagria geminipuncta* in reeds and we observed traces of *Leucania straminea* everywhere. *B. roboraria* was seen.

I was at Wye in Kent on June 25th, and at sugar I took two *Pachetra leucophaea* (good condition)—also one or two *X. sublustris*. The same night I observed a male *Siona lineata* and the following day about five miles away my mother and I took a small but perfect series of this species, mostly at dusk (an unusually late date).

June 27th found us at Folkestone. *Tapinostola bondii* was at its height on that date, commencing to fly in its very limited ground at 9.30 p.m., and pairs were found sitting about later.

The following night (28th), I took a female *Heliothis peltigera* on the flowers of figwort in the Warren. In the day time I took one *Pyropteron chrysidiformis* on the wing and one larva also (for 1929?). At Deal on the 29th, larvae of *Callimorpha dominula* were still about, but proved to be mostly "stung." *Melitaea athalia* was found at its local headquarters to be well on the wing on June 30th, and stranger by far I was the only collector there (save one). I worked particularly hard for *Dianthoecia albimacula*; "dusking" produced merely *D. conspersa*; realising I was late for imagines I searched each plant individually in its precipitous situation for ova or young larvae, but met with no success, so before leaving I gathered a bunch of the catch-fly from which subsequently I obtained three larvae of this species.

On July 2nd I was at Torquay for the day, and took an *Agrotis lunigera* = *trux* (female) at sugar.

On July 4th, my mother and I arrived in the Northamptonshire district, the quest being *Tapinostola concolor* (*extrema*). The first night I met with failure, but the following night I took my first *concolor* at rest on grass at 11 p.m. Quite suddenly at about 2 a.m. they commenced to arrive at the headlights of the car and in an hour about 20 were boxed, a few pairs were found on the grasses round about. The flight was apparently over by 3 a.m. *B. roboraria*, *Abraxas sylvata* (3), *Petilampa arcuosa*, *Comibaena pustulata*, *Noctua festiva*, etc., also turned up at the headlights. Not an insect came to sugar.

Mr. Worsley Wood and I again visited this locality on July 14th. We actually saw a few *concolor* during their first flight at dusk, and between 2 and 3 a.m., took a good many more. They were behaving exactly the same as before. The following species also came to headlights. *Cosmotriche potatoria* (in numbers), *Aretia caja*, *Leucania impura*, *L. lithargyria*, *Nola cucullatella*, *Leucania conigera*, *Noctua ditrapezium*, *N. festiva*, *Comacla sener*, *Cybosia mesomella*, *Miltochrista miniata*, *Comibaena pustulata* (common), *Hemistola chrysoprasaria* (*vernaria*), *Hemithea aestivaria* (*strigata*), *Ptychopoda biselata* (*bisetata*), *P. trigeminata*, *Caradrina alsines*, *Boarmia repandata*, *B. roboraria*, *B. gemmaria*, *A. sylvata*, *Agrotis obscura* (*ravida*), *Habrosyne pyritoides* (*derasa*), etc. *Toxocampa pastinum* was exceedingly common on the wing while *Philereme retulata* abounded at early dusk around the purging Buckthorn.

From July 11th to August 15th I was back at Cambridge. On

the 11th my mother and I found by diligent searching upwards of 20 *D. irregularis* very small larvae on *Silene otites*. On the following days I took about 80 and by not admitting any except the very smallest to the breeding cage had only one death up to pupation. I took also two larvae of *N. reticulata* on the same plant.

On July 21st I took my first *B. muralis* var. *impar* at light at midnight. Mr. Worsley Wood and I succeeded in taking 26 between us—it generally comes to light between 1 and 3 a.m. in the morning, so my nights were somewhat broken in the last nights of July and early August. Day time searching walls produced about 50% of the total. This so called "form" seems remarkably constant.

On July 22nd I took 2 worn specimens of *Tapinostola elymi* on the sand dunes near Hunstanton and one fresh *Acidalia emutaria*.

(To be concluded.)

Spain in the Spring of 1928.

By COMMANDER WYNDHAM FORBES, R.N., F.E.S.

I reached Gibraltar very comfortably by sea in a Nipon Yusen Kaisha liner, travelling second class, for £7, sailing from Tilbury on February 11th, and arriving on the 15th, at about six p.m. I crossed to Algeciras next day, and put up at the Continental Hotel, at which I stayed several times.

The weather was beautiful, and next day I examined the waterfall valley and its woods, about an hour's walk from Algeciras. I found *Zerynthia (Thais) rumina* in small numbers, a few *Pieris rapae*, and *Pararge megera* with many *P. aegeria*, but only very few specimens of *Anthocharis belemia* and those by the road side, chiefly on the rough edges of cultivated ground.

Next day a levanter began, and the weather was chiefly cloudy or rainy till March 14th, by which time the winter brood of *A. belemia* was over. On that day I was again in the woods of Algeciras, having beguiled the bad weather by a visit to Seville. Then there were plenty of *Z. rumina*, and *Thestor ballus*, *Euchloë euphenoides* and *Polymnatus icarus* had also appeared. On the 16th I went to the beautiful and extensive woods of Almoraima, about an hour by train from Algeciras, finding there the same butterflies with the addition of *Callophrys rubi* and *Leptosia sinapis*. The *C. rubi* are similar in colour to those of Provence and Sicily, but their androconial patch is much darker showing very conspicuously against their almost metallic ground colour.

After that bad weather prevailed again. I went to Ronda and Grenada, dividing the time between influenza and sightseeing, and finding no butterflies of interest till I got to Ronda again on March 30th. Here I found *A. belemia* again on the top of the cliff to the west of the town; it was still in the winter brood, which was long over on the low ground—Ronda is 2460 feet above sea level. It is remarkable what a bluish white *A. belemia* appears to be when flying. A fine pink *Asperula* rather like *A. tuberosa* grew on the cliff, also a pink cistus. I went on following the edge of the cliff away from the town, passing some pines into a sandy wood of ilex with cistus below. Here were *Coenonympha pamphilus*, *Rumicia phlaeas* and *Anthocharis tagis*. The latter does not agree with Seitz' description—so far from the white

spots on the underside being more sharply defined than those of *A. belia*, they are much less so, sometimes in fact almost obsolescent. Nor is the black discoidal spot, described by Wheeler in var. *bellezina*, apparent. Bearing to the right I soon got out of the *tagis* ground, and began catching *A. belia* instead. This form of *belia* is rather like the Provençal one, but the ground colour underside hindwing is usually of a colder and duller green. Here too I took a few *T. ballus*; a smaller race than the coastal form, and much colder in colour, the underside forewing of the males lacking the orange suffusion of the ground colour, which is cold grey, and the underside hindwing blue, or greenish blue, instead of being yellowish green. I call this race **phychrokoilios**. Its females are also greenish blue underneath the hindwing.

On April 11th, I returned to Algeciras where, and at Almoraima, I found the second brood of *A. belemia* flying, but not very numerous; other spring butterflies were common. The large white gum cistus at Almoraima in full flower is a sight worth seeing, and *Convolvulus tricolor* in places delights the eye. There are also blue masses of the large periwinkle, and I counted four other species of cistus, a minute crocus, a scylla, *Anemone palmata* and other flowers.

On the 16th I went north sight seeing in Cordova, which does not look a good place for butterflies, and in Madrid. At Escorial on the 23rd were *Euchloe cardamines* and some "whites"; the country around looks good, but everything much later than in Andalusia. Escorial is 3030 feet above the sea. From the 25th to the 4th of May I was at Toledo, 1735 feet. Up the hill on the left bank of the Tagus is some rough ground with ilex trees, and here I found *Plebeius medon* (*astrarche*), *Scolitantides baton*, *E. euphenoides*, *A. belia*, *Polymnatus thetis* (*adonis*), and one *Melanargia syllius*; there too, I saw a man searching for white truffles by prodding the ground in likely places with a wire. They are very excellent when properly cooked. The *A. belia* here are similar to those at Ronda, and some of the *P. thetis* (*adonis*) very marked with black submarginal spots on the upper side of the hind wing of the males. (ab. *punctifera*.)

May the 9th found me at Catalayud in Aragon, where I could only find "painted ladies," *P. aegeria*, *A. euphenoides*, *S. baton* and *Papilio podalirius*, and on the 14th I went on to Albarracin. Here in Valdovecar *Z. rumina* was flying, very like the Provençal race but rather less red; and other early spring butterflies. I hoped to have taken *Zegris eupheme*, but never saw one, although I searched daily and stayed till well after their season. Herr Karl Predota told me that they were flying in the wheat in Valdovecar on the 18th, almost the only day I was not there. The weather was very cold and rather changeable, on the 23rd, for example, the thermometer was 48° F. at 9 a.m. I took, however, all the butterflies one might expect—they have often been enumerated by previous writers—and was joined on June the 1st by Mr. P. Haig Thomas, to whom I leave the description of our joint proceedings.

Reviewing matters, I do not think the weather treated me at all well. I went out in February for the sake of *A. belemia* and *Z. rumina* and though I took plenty of the latter, the former, and *Thestor ballus*, were very scarce, and *Zegris*, often common at Albarracin, was a disappointment.

I did not stay at any of the expensive hotels, but found quite reason-

able ones at about twelve pesetas a day for board and lodging. The food I have often heard abused by untravelled persons—I think it very good. I only tasted garlic about three times, and then it was not very bad, and other dishes were available for those who did not like it. I knew no Spanish when I left England, but depended on phrase books until I picked up enough for practical purposes, a thing anyone can do who will take the trouble. I met with neither bugs, fleas, nor mosquitoes, but that, no doubt, was good luck. I found the Spaniards without exception peculiarly sympathetic, helpful, and courteous.

Euchloë cardamines v. hesperidis.

By T. FRED MARRINER, F.E.S.

South—"Small specimens some not more than one inch and a quarter in expanse occur from time to time. In these dwarfs the orange patch does not reach beyond the black discal spot, which in normal specimens it usually does. This small form has been considered a distinct species and the name *hesperidis* has been proposed for it."

A few years ago I became interested in this dwarf form of *cardamines*, through finding it year after year in the same collecting area. I was, however, unfortunately compelled to leave my study incomplete and only bring my notes forward now in the hope that others interested in the species may be induced to go further in the matter than I have, so far, been able to do. My notes are based entirely upon outdoor observations and need supplementing by laboratory work.

First of all this dwarf form, when found where the normal variety does exist, is invariably from a fortnight to three weeks earlier in appearing than the normal variety, and disappears before the normal.

Secondly, the dwarf is not found in all localities in which the normal is found, and in at least two of my localities, while the dwarf form is usually common, the normal is a rarity.

Again, in my experience the dwarf and the normal do not pair, but dwarf and dwarf only.

The dwarf, especially the female, flies along the tops of hedges or high up along the lee side, while the male seems to prefer the shade and keeps below the hedge top. The flight is never long—not so long as that of the normal variety.

The dwarf seems to prefer *Brassica sinapistrum* (Hedge mustard), while if both plants are present the normal will rather alight upon *Cardamine pratensis* (Cuckoo flower). I have observed the female lay her eggs on *B. sinapistrum* and in comparison with the normal the dwarf seems to lay fewer and, strangely, the eggs examined were slightly larger than those of the normal variety. The larvae are smaller than the normal and those examined were of larger girth, but otherwise I noted nothing to distinguish them from the usual normal form. Of its further life-history, I cannot say anything at present, except that it pupates earlier than the normal variety. If opportunity occurs, I hope to go fully into the life-history during the coming season.

It has, I believe, been suggested that this dwarfing is due to food scarcity, but in this particular case, at any rate, there seems to be more than this, for all the usual food plants are to be found in a sufficient

plenty for the normal sized insect in the localities and at the time of appearance of the dwarf form. Of course the seeming exclusive use of *sinapistrum* may have something to do with it, may perhaps fully account for the small size and quicker development, but more experiment is required here, and I should be pleased to hear from any others who may have made a study of the dwarf form. There are two localities near Carlisle, where it appears every season, and the same remark applies to Dovedale (Cheshire). In each of these the range is limited to a small area, in the case of Carlisle to two lanes and an old quarry in each of which the normal variety appears more or less regularly about three weeks later. The male is commoner than the female, and I have taken specimens ranging from $\frac{3}{4}$ " to $1\frac{1}{8}$ " expanse.

Miscellaneous Notes from Argentina.

By K. J. HAYWARD, F.E.S., F.R.G.S.

SHORT DESCRIPTION OF THE LARVA OF AUTOMERIS ASPERA, FÉLDER.
IMAGO No. 7512.

Length 65-70mm. Proportionately thick.

Head dark mahogany brown, glabrous, with some white short hairs. Body above and beneath dark mahogany brown closely covered with greenish yellow speckling in the form of tiny irregular streaks and spots, the latter for the greater part with a centre of the ground colour, but this is not distinguishable except under magnification. A yellow dorsal stripe, well defined on the thoracic, and on the forward $\frac{1}{4}$ of the abdominal segments. Dorsally on the abdominal segments there is a thin angulated U-shaped mark, of greenish yellow, open forwards, fairly clear within except for a few spots at the open end.

Legs chestnut red with mahogany extremities.

The *Larva* carries the following extensive array of spines, chestnut red trunks with greenish yellow branches. On the thoracic segment a ring of eight pointing forwards, the dorsal pair on the first and second segment, the upper lateral pair on all the three segments more developed, longest on the second. On the abdominal segments a ring of six spines with an additional marginal pair on segments 6 and 7. The dorsal pair shorter and stouter, the upper and lower lateral pair more slender and longer, the upper pair being the longest. All these spines point backwards and increase gradually in length towards the anal end, the dorsal pair reaching a length on the last segment of 8 mm. On the penultimate segment an additional spine placed centrally on the dorsum.

Cocoon.—The larva forms a brown parchment-like cocoon, smooth surfaced, with a few bits of dead leaves or grass woven in. From the appearance of the cocoon I should imagine that they are placed in crevices of the bark of the food-plant tree.

Pupated April 16th, 1927. Emerged February 19th, 1928.

Foodplant. Aromita. (Algarrobillo). *Acacia macrantha*, Hum.

The two larvae from which this description was made were found respectively near Ubajó, and near Isla Rica on the Villa Ana-Ubajó road whilst I was partridge shooting in April of 1927. The imago has been sent to the B.M. under No. 7512, and the cocoon and pupa from which

it emerged under No. 7514. The second larva in spirit under the No. 7513.

Egg.—Since writing the above I have received a female of the moth which deposited a batch of eggs. These are pea-green, 1.6mm. in length by 1.4 mm. broad, whitish at the head end and slightly flattened, and are laid in clusters with a number of hairs attached. Just before emergence a round black spot appears at the head with the dark body showing indistinctly under the shell on one round side for half its length. Remainder of shell becomes light brown with white markings. These markings appear as a brown backbone with alternate brown and white ribs (the latter not connected with the main rib however) on the dark side of the egg. In thickness between the flattened sides about 1.1mm.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

COHEMBA.

After the sandy, dry, rather monotonous high bush country in which we have been wandering for the past three months, it is a pleasant change to come down to Cohemba. Properly speaking this is the name of a small river that is a secondary tributary of the Cuanza, but at Kilo 782 on the Benguela Railway there is one of those volcanic dykes, which intersect the country here and there and produce waterfalls where they cut across the numerous rivers. The falls here at Cohemba are very fine, much surpassing those of the Luena; even at the close of the dry season there is plenty of water, and the fall is over a hundred feet, down into a narrow, rocky gorge. The abundance of moisture keeps the place green and the vegetation is luxuriant and here we really feel that we are in the tropics, a sensation which did not come to us in the dry high bush. The altitude is a little over 4000 ft., so the actual difference in height is only about a thousand feet and the milder weather is probably more to be attributed to the approach of spring than to the lower level.

The hard rock of the dyke weathers easily, decomposing into a red laterite, which is a fertile soil, welcome after the dry incoherent sands to which we have become accustomed. And the surprising thing is that there is a big farm here; it is well run, well equipped and modern, under German management, to whom we are indebted for much hospitality, and to the very welcome treat of fresh vegetables and fruit. After the almost gameless country where we have been living almost exclusively out of tins, it is a pleasure indeed to enjoy fresh meat from a roan or other buck, for here there is game, with fresh green vegetables, carrots, peas, spinach, cabbage, tomatoes and bananas, and, wonderful to relate, not only fresh milk, but strawberries and cream. The change is almost bewildering, and it seems that we have tumbled on to the one and only spot in Angola where there are strawberries to be had.

The fauna is richer, too, and I have come across a few fresh kinds of Orthoptera. I have already mentioned the striking green Acridian with scarlet and bright blue spots, and a new Truxalid with orange wings. Also, in the bogs I find a very minute cricket, nearly as

nimble as, and no bigger than, the *Tridactylus* which occurs with it. I am looking forward to taking the adult of the winged *Saga* mentioned in my last letter, and some of the *Oedipodidae* and *Stenobothridae* seem unfamiliar and at least one of the smaller Acridians.

In the richer ground below the falls I found a nymph of *Empusa*, apparently the same species that I took in the adult stage at Loanda in April; another interesting Mantid is a small, delicate grey creature, like an *Ameles* but longer and slimmer, with eyes like those of a hammer-headed shark; here there is an abundance of slender grass-like *Mesops*, some with smoky, some with yellow wings, and the odd-looking Opomalid with the bright silver lateral band. Another nice Mantid has a parallel sided pronotum as in the *Orthoderidae*, with prominent rounded eyes and I notice that, like *Pyrromantis*, it tucks its fore-legs away neatly into the pronotum, the curvatures of the lobes of which exactly fit the outline of the anterior femora. Another very striking Mantid is unfortunately only in the nymph stage, but it resembles a slender stick-insect; it is four inches long and only one eighth of an inch wide. The two handsome local Acridas are common enough, one with yellow wings banded with black, the other with a beautiful crimson tint.

Almost all the Orthoptera are of the reddish or yellow buff colour of the dried and withered grass except when they first hatch out, when they are green, which is probably the original colour of the creatures. The Acridas, for instance are all of a rather reddish than yellow tint, but one was bright green, evidently a freshly emerged specimen. The Acridians were generally paler than they were a month or two back. When the rains turn the grass green again they will be rather prominent; perhaps they will die off and be replaced by the younger generation which will be green. I hardly expect the buff ones will be able to revert to their original green. The phenomenon is just what we see with bananas; a hand of green bananas will ripen into the familiar yellow, but they will never go back to their youthful tint.

There are signs that the dry season is approaching its end. The gales are less frequent and less violent; the morning frosts are over, we hope for good, and the early mornings, though fresh enough, are not bitterly cold. Sometimes the mornings, sometimes the afternoons, are cloudy and the sun has more power and in the middle of the day can be quite hot. The last winds have stripped most of the trees of their dead leaves, which now carpet the floor of the forest, and the crackle of the dried shrubs and twigs speak of the end of a season. About half the trees around our camp are now stark and leaf-less. The pale and dessicated-looking Orthoptera, especially *Acrida* and a species of *Caloptenus*, remind me, too, of the autumn in Europe.

But alongside this autumn we have spring. The other half of the trees are covered with the most succulent young tender foliage, showing delightful russets, pinks and Venetian reds; in the distance this gives the effect of an October day in an English wood, but when near, the juicy and tender nature of the foliage can be seen. New plants are shooting up from the ground, with the promise of delightful flowers to come. The confusion of the seasons is bewildering to the newcomer; our farmer friends tell us that they get strawberries for six months in

the year, that is throughout the dry season, but the rains of course rot them; bananas they have all the year round, in profusion.

Bird life does not strike me as very exotic; on the bog near our camp are stonechats, not quite the same as ours, but very like them, and herons and storks, all resembling our old friends, but yet just a little bit different. I am sure the genera are the same. The other day a flock of eight storks wheeled overhead for several minutes; they had the red beak and legs and the black and white plumage all in order, only the black and white were arranged differently. Then a cuckoo flew over and cucked near the camp; it looked uncommonly like our old friend in flight and figure; the voice, too, was of the same timbre, but the note was monotonous. We see but few birds of prey and only now and then does some strange long-tailed widow-bird, or squawky and brilliant parrot give an exotic touch to the scene. The very bogs seem homelike; the water-beetles I am sure belong to our genera, only there are two species of *Gyrinus*, one double the size of ours; the water-bugs all have a familiar look, there is *Gerris* and *Ranatra*, which looks much more at home in African surroundings, where so many insects are long-drawn-out, than it does with us.

Below the falls I took that brilliant green and gold Pygomorphid, *Taphronota* sp., which I have noted from the Langiliko in a former letter. It was sitting on a tree with leaf, fruit and timber just like a walnut, and allowed me to pick him off with the fingers. The dark green elytra and femora harmonise perfectly with the leafy surroundings; the yellow tips to the antennae break the outline and give the impression of a flicker of sunlight through the trees, and when he flies, of course, the bright orange wings flash the same effect. It is the same thing that we see in the beautiful bee-eater, whose brilliant and varied plumage fits in so well with the bright sun's rays. One very strange bird is to be seen at dusk and occasionally flushed in the scrub during the day, when he flies off but a few yards and settles again on the ground, dazzled by the brilliant light: that is the local nightjar, figured in so many books on natural history, with long streaming racket-like feathers flowing from his wings; when he is flying the effect is very odd, for it looks in the dim twilight as though there were two birds flying interlocked. The churning note resembles ours, but is more woody and the frequency is less.

Experience in the field in Africa has confirmed up to the hilt my old opinion that in the Orthoptera, colour and pattern has no specific value. I am more and more inclined to believe that the two forms of common *Acrida*, which are common here, one with crimson, the other with yellow wings banded with black, are very probably but two forms of one and the same species, and breeding experiments would be very interesting; they occur together in the same places at the same time; the only other difference I can see in them is that the yellow-winged form is generally paler all over, while the crimson-winged form tends to have a general reddish tint.

There is an even more striking instance of what I consider polymorphism, in an allied genus; this is a small, ensiform Truxalid, like a small *Acrida*, but the elongation of the head less pronounced. It is this species which provided me with those surprising "burnt grasshoppers" from the Langiliko which formed the subject of an earlier letter. I have been taking here recently a very similar creature,

without the sooty tinge, and with bright orange wings; it occurs in the scrub. And this morning, on a grassy plain near a bog, which is burnt in patches, I have the following forms of what I believe will turn out to be one and the same species. (1) "burnt," with sooty fore part shading off; wings faintly blue with a black fascia; (2) similar, but not "burnt," with pale blue wings and no fascia; (3) similar, but with violet wings, or rather, raspberry coloured; (4) with orange wings; and (5) with colourless wings. Perhaps the latter is the same as the grey form so common in the forest. Now I took these all in the same spot at the same time. The coloration of the body varies with individuals; some are all buff, some have a green dorsal stripe, some a brown dorsal stripe, and some have the sooty shading and look exactly as though they had been charred in the fire and escaped with their lives. In Europe we are familiar with the occurrence of yellow wings in normally blue or crimson-winged *Oedipoda* but this seems to be a form of albinism, as suggested by Brunner, due to failure of pigmentation. But while the faint blue may be an albinistic variant of the red or raspberry colour, the yellow is too deep and too rich to be explainable by failure of pigmentation and must be a definite colouring. Probably it is an extremely plastic species, adapting itself freely to a varying environment and indulging in a fanciful variety of coloration in the wings, which, being exposed only during flight, are independent of adaptation to the surroundings.

AUGUST 31st, 1927.

Another Mantid to-day; this time a slender stick-like creature but much smaller than the ones previously reported; it is brachypterous and the wings are orange with a dark fascia, an unusual type of coloration in the Mantids; the general colour is fawn and it is clearly a grass-haunting species.

There is an Acridian which is abundant and I have taken it in every locality I have visited; it is rather a stoutish fellow, with oblique white bands on the sides. I am now taking it with distinctly yellow bands and the posterior tibiae are bright blue; this greater intensity of coloration may be due to the increasing humidity of the atmosphere and preparation for a livelier uniform during the approaching rainy season.

Animal life generally is more interesting here than in the higher woodlands of the watershed. On the open treeless valleys of the streams gazelle-like oribi are numerous enough and we sometimes get them for dinner, and venison is occasionally provided by roan; we see red buck, too, but have not yet shot one here. Game birds are commoner here as well, and we have seen, and sometimes shot, guinea-fowl, francolin, and a bustard that resembles *Houbara macqueeni*, a very beautiful bird too, with a strange, raucous voice. And this morning, to his great delight, Pavel Stepanovitch met a Secretary-Bird out for a walk; he was stalking buck, and abused the bird as it came walking along, for at first he mistook it for a man.

A new acquaintance to me is a small Acridian grasshopper about the size of an ordinary *Stenobothrid* with a pattern that is unusual in the Orthoptera; the first I took was pale grey blotched with chocolate and later specimens are of the same general pattern, though differing

in detail; the two colours are sharply contrasted. Also a Pyrgomorphid that is unfamiliar to me; it is of the same general structure as the *Pyrgomorpha* with violet wings that is so abundant, but is pale grey in colour, dotted with bright orange specks, and has bright orange wings. And now I have taken the adult form of a curious Mantid of which I reported a nymph from Busaco; it is a big fellow, long and slender and is remarkable in having a comb-like ridge on the fore trochanter: the elytra are short and lanceolate, dark blackish grey like the rest of the body, but with an orange discoidal spot; the wings are short, rounded, smoky black, decorated by a series of angular, transverse yellow lines between the radiating veins. It is probably a *Danuria* sp. ♀.

SCIENTIFIC NOTES AND OBSERVATIONS.

THE LARVAL FOOD OF *ATHOUS RHOMBEUS* (COL.).—On Dec. 2nd I went to Hut Wood near Southampton for the purpose of taking specimens of the longicorn *Mesosa nubila*. In this wood felling operations have been in progress for some years now, and the woodmen have thinned out the oaks each year in a different part of the wood. The beetle may be found rather sparingly in decaying branches from the tops of newly felled oaks, but it is plentiful in the branches left lying where they fell when trees were felled two years ago, for in this particular wood only the large timber is carted away, and the boughs and branches of moderate size are left to rot among the undergrowth. Several times I have found on splitting open the decaying branch, only the debris of *Mesosa nubila* in the cell where normally I find the living imago waiting for the Spring before biting its way out of the wood. I used to attribute the damage to Snakefly larvae, which are not scarce in dead and decaying oak branches, but on the date mentioned I found a living beetle in its cell with a coleopterous larva in the act of feeding upon it. There was a gaping hole in the underside of the abdomen, and when set free the beetle actually walked about with the larva still feeding upon it half hidden inside its abdomen. This coleopterous larva has been identified very kindly by Mr. H. Donisthorpe as that of *Athous rhombeus*, which is well known to feed on larvae and pupae of various kinds.—WM. FASSNIDGE (M.A., F.E.S.), 47, Tennyson Rd., Southampton.

NOTES ON *COLIAS CROCEUS* (EDUSA).—I was staying at Vernet-les-Bains, Pyrénées Orientales, from June 22nd to July 7th last; and I found *C. croceus* as abundant there, as it has been elsewhere, this year. Two or three observations on it may be worth recording.

1. *Food-plant*. I watched eight ovipositing ♀♀ very closely (including one of the *helice* form) and saw these eight examples deposit a total of 23 eggs under absolutely wild conditions. I found that, although there was plenty of clover both red and white—and the clover was very conspicuous, as well as vetches of several species; the females watched took no notice of any of these plants but searched the herbage until they found plants of the Birds' Foot Trefoil (*Lotus corniculatus*) which were inconspicuous and by no means easy to find; and every one of the 23 eggs was deposited on a plant of *Lotus corniculatus*.

2. *Vertical distribution*. On Canigou most of the common lowland

species of butterfly range to about 6,500 ft., but *C. croceus* went much higher, though in reduced numbers. A few could generally be seen at the upper limit of the range of *C. phicomone*; and on one occasion when I was on the cairn at the summit (9000 feet) an example of *C. croceus* was observed flying a full 50 feet above my head.

3. *Time occupied by life-cycle.* One egg, taken on my last day, was brought home and placed on a plant of *Hippocrepis comosa* in my garden. (I had no other possible food there.) I forgot the matter until one morning, barely 6 weeks later, I saw a freshly emerged female on the plant! This strikes me as a very rapid life-cycle for England.—J. A. SIMES (F.E.S.), Nov. 21st, 1928.

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at the Zoological Museum, Tring, on October 27th, 1928. Lord Rothschild in the chair. Members present in addition to the Chairman—Mr. Robert Adkin, Mr. H. St. John K. Donisthorpe, Prof. E. B. Poulton, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, and Mr. W. J. Kaye. Visitors—Messrs. K. G. Blair, P. A. Buxton, Dr. E. A. Cockayne, C. L. Collenette, Dr. F. A. Dixey, H. M. Edelsten, P. P. Graves, E. E. Green, A. Hall, Dr. E. Hartert, Capt. A. F. Hemming, Dr. K. Jordan, J. Levick, G. M. Mathews, Dr. S. A. Neave, W. G. F. Nelson, L. B. Prout, W. P. Pyecraft, W. Rait-Smith, N. D. Riley, W. G. Sheldon, W. H. T. Tams, Hy. J. Turner, C. J. Wainwright, J. J. Walker, Dr. J. Waterston, H. T. G. Watkins, Rev. G. Wheeler, and A. E. Wileman. The Meeting was arranged at the Museum which was open from 9.30 a.m. to 5 p.m. where the vast collections of Lepidoptera were open for inspection. Lord Rothschild specially exhibited the following:—(1) 83 drawers of *Parnassius apollo* containing 6952 specimens of 117 subspecies (local races) and also 4 hybrids. (2.) The collection of British Butterflies (Rhopalocera) contained in 111 drawers and consisting of about 17000 specimens including many remarkable aberrations. The specially noteworthy specimens other than aberrations are 32 large coppers (*Chrysophanus dispar*), 3 *Argynnis niobe*, 1 Arran Argus (*Erebia ligea*) taken at Galashiels by A. E. Gibbs, and 1 *Gonepteryx cleopatra* taken at Brighton side F. W. Frobawk. Of aberrations the most remarkable are 3 black swallowtails (*Papilio machaon*) and a sulphur-yellow large white (*Ganoris brassicae*). Luncheon was served at 1 o'clock, after which a business meeting of the Club was held and the visitors spent the remainder of the afternoon in the Museum. The company dispersed about 4.30 p.m. after a most successful meeting.

Entomological research in the Federated Malay States, it is officially stated, has been seriously hampered by several moves, and it has not been possible to start long series of experiments owing to the loss of continuity which will be caused by the final move when repairs to the buildings are put in hand. In addition, the creation of a Division dealing with insects of medical importance as a whole has necessitated a complete re-organisation of records and methods of work. Subjects, however, now engaging attention are:—The Anophelines of Rice-fields; the Effect of various stomach-poisons of anopheles larvae; and

a Study of the Acarina in relation to tropical Typhus and Tsutsugamushi fever.

From the end of last century English entomologists have searched the Alps of Switzerland from end to end for butterflies with now and again trips to S. France, the Pyrenees, a few Spanish localities and Norway. Very few indeed were those who went further eastward. A correspondent the other day sent series of British examples of numerous species to an entomologist in Vienna, and in reply was told that most of the species were of forms that did not agree with the Austrian forms, in fact, were local races if not subspecies. Was it not from this area, the Eastern Alps and South Germany, that many species and forms were first described? Poda wrote from Graz in 1761, Schrank from Nuremberg in 1802, Denis and Schiffermüller from Vienna in 1775, Scopoli from Carniolica in 1763, Esper from Erlangen in 1780, etc., and now we have numerous faunal works produced by the smaller local societies, which are excellent guides to entomological visitors. Of these *Die Schmetterlinge Südbayerns* by Herr Osthelder, issued as a supplement to the *Mitt.* of the Munich Entomological Society, is a capital example. The first part comprising the butterflies, published in 1925, consists of 166 pages with 7 plates of local forms. Particular attention is paid to the variation and local distribution, and to the influence of elevation, the main features of which are pointed out in the introductory section. Two further parts have been published in 1926 and 1927, with 9 additional plates, bringing the work to the end of the *Noctuidae*.

From our worthy correspondent Signor Alfredo Faz, have come some Chilean entomological matters:—The first number of *Boletín, Soc. Ent. de Chili*, a modest but interesting record of last (1927) year's sessions of this Society founded in 1923. The record of the previous four years work we are told will be found in the *Revista Chil. Hist. Nat.* for the corresponding years. We note that several widely known entomologists are among the active members of the Society, Prof. Carlos S. Reed, Prof. Carlos E. Porter, with Dr. Howard of Washington, Dr. Horn of Berlin, R. P. L. Navas of Spain, and the late Dr. A. Berlese of Firenze, etc., as corresponding members. The two further items sent were on *The similarity in the Colours of different Insects of the Chilean fauna*, by Prof. Reed, and *Colouring Matter of the Tegumen of Insects*, by Dr. Oyarzún.

The heft 2, *Verh. zoo.-bot. Ges. Wien*, contains a list of Microlepidoptera taken in Andalusia in 1925, 1926 and 1927, by various collectors, including 254 named forms of which more than 12 are newly described; and also a list of Microlepidoptera collected in Morocco in 1908-9 including descriptions and figures of several new species.

Our colleague Mr. R. S. Bagnall has sent eight separates on Thysanoptera of which he is the author. For years past he has studied the species found in the British Islands and now he is engaged in a special examination of European species and is prepared to receive examples from all countries of Europe. Three of these separates were of articles published in the *Ann. and Mag. Nat. Hist.* "Contributions towards a Knowledge of the European Thysanoptera," the results of personal visits to Italy, France, Spain and Switzerland, Belgium, Norway, etc., and from correspondents in other places. Mr.

Bagnall has also published a "List of British *Eriophyidae* (gall mites)" and has described in the "Insects of Samoa," the Thysanoptera collected in Samoa by Messrs. P. A. Buxton and G. H. E. Hopkins.

Many magazines now issue more continuous matter as supplements. The *Int. Ent. Zeit.* of Guben, Germany, at present has in progress an important and very fully illustrated summary of the destructive ravages of insects, by Herr G. Lederer. In the 40 pages so far issued there are 47 illustrations and 13 plates, 2 of which are coloured. When concluded this should prove a very useful book of reference to the student of economic entomology. In the body of the magazine we find a long description of the work of the Hill Museum, several articles on melanism and industry by Dr. Hasebroek, notes on the recent unusual abundance of *Heliothis peltigera*, with faunistic, literary and descriptive matter.

Aristide Caradja has recently published an account of the Microlepidoptera of the neighbourhood of Palermo, Sicily, largely based on the material collected by Stauder in the Spring and Summer of 1927, but including previously existing records.

The *Trans. Carlisle N.H.S.*, Vol. IV. has recently come to hand and contains as did the former volumes rather more entomological matter than is usual in provincial societies' periodicals. No doubt in this case the preponderance is due to the perennial enthusiasm of the two entomologists G. B. Routledge, J.P., F.E.S., and L. H. Day, F.E.S., the former a past-President and the latter the Hon. Secretary of the Society. Mr. Routledge concludes his account of the Lepidoptera of Cumberland with the Plumes, Tortrices and Tineae and deals also with the Orthoptera, while Mr. Day takes up the Hemiptera-Heteroptera, the Paraneuroptera and an addendum to his previously published List of the Cumberland Coleoptera. The Geographical area dealt with, contrasted with the rest of England, makes the records in all these groups of exceptional interest. So far 1002 species of Lepidoptera have been recorded compared with over 2100 native of Britain. The volume, 166 pages, is extremely well produced.

BITUARY.

G. Riches.

The members of the London Natural History Society were much grieved to hear the almost tragic death of one of its number who for many years was a regular attendant at its meetings. Mr. G. Riches was head gardener at a large house in Hornsey for nearly fifty years and retired in September last. The esteem in which he was held was marked by the handsome gift of £500 from his long time master. With his wife he went down into Kent for a few weeks, but in returning he took cold and died after only a few days illness. Of a retiring disposition, only those who knew him intimately appreciated his steady and earnest entomological work. He was very skilful in breeding and his close friends were often beholden to him for choice forms of species he had been working with. He made the most of his limited opportunities and many were the forms of *Abraxas grossulariata* and of other such-like variable species that he obtained and exhibited. He was one of the rank and file who took a life-long pleasure in the living insect, and loved to watch its development and variation, time in and time out.—HY. J. T.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. Hy. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Duplicates.—Fine bred *prunaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurstone Road, Newton Abbot.

Duplicates.—British Noctuae and forms.

Desiderata.—Pupae: *opima*, *populeti*, *incerta*, *gracilis*, *capsophila*, and many others.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus* spp., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytococcidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

Pairs of *Synanthedon flaviventris*, Stgr., bred Hampshire, 1928, in exchange for Entomological literature of any kind, especially foreign periodicals, proceedings and separate. Wm. Fassnidge, Hon. Librarian, Hants. Ento. Soc., 47, Tennysen Road, Southampton.

Wanted loan of series of *E. jurtina* (unusual aberrations not required) from East Anglia, N. and S. Wales, Northern England, Scotland (E. and W. sides), and Connaught, for study of geographical variation.—P. P. Graves, F.E.S., 5, Hereford Square, London, S.W.7.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. February 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. November 22nd. Jan. 24th. Annual Meeting, Feb. 14th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., J. P. HARDIMAN, C.B.E., B.A., 1, Chatsworth Road, Brondesbury, N.W.2.

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IMPORTANT

TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

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(Vols. I-XXXVI.)

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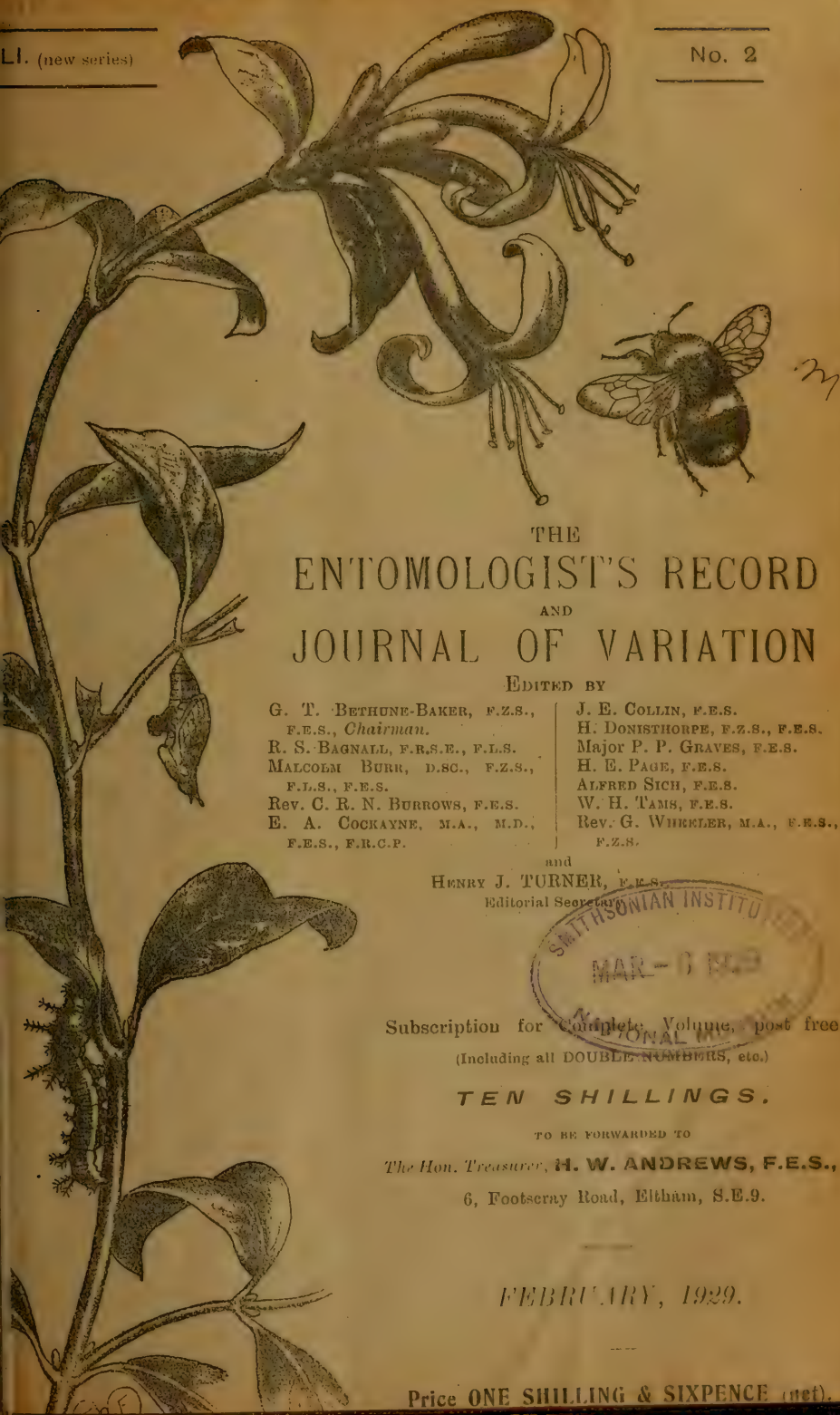
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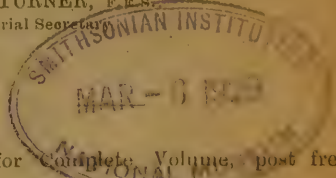
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Observations on Mr. Donisthorpe's "Guests of British Ants," Chapter XII. Pseudoscorpiones.

By H. WALLIS KEW.

Since commendation must always imply superiority it is not my intention to enlarge on the high value and peculiar charm of Mr. Donisthorpe's work. I desire merely to offer some observations on the Pseudoscorpiones-chapter, wherein the author shows that these Arachnids have frequently been found in ants' nests in various parts of the world. W. W. Smith (1921) in New Zealand has observed Pseudoscorpions in the nests of ten of the twenty-two ants known there. Tuligren (1907) founded the genus *Myrmochernes* for the reception of a curious South African Pseudoscorpion found by Dr. Brauns with a *Camponotus*. But whether *Myrmochernes*, or any other Pseudoscorpion, is strictly myrmecophilous, i.e. found only with ants, has not (I think) been conclusively shown. Mr. Donisthorpe has done well to preserve the details of his captures of certain of the common or locally abundant ground-species of *Obisium* and *Uthinius* in ants' nests, but he would not, I suppose, attach any special significance to such occurrences.

Of much greater interest are his observations (1907, 1910) concerning *Chelifer scorpoides*, which he has taken on various occasions in *Formica rufa* nests at Weybridge, in Surrey, and at Buddon Wood, Leicestershire. In the latter locality he found males and females (and some females carrying eggs externally) in the nests in great profusion, especially at the very bottom. They occurred in thousands, and every handful of the nest-debris swarmed with them. Other observers have found this *Chelifer* with the same ant—but never in great quantity—viz. Hansen (1884) in Denmark, De Lessert (1911) in Switzerland, and Walsh (1924) in Harwooddale, near Scarborough. To these observations it may be added that in 1907 the somewhat larger *Chelifer cimicoides* was found by me in a *Formica rufa* nest in Burnham Beeches in numbers. The nest was heaped up against the trunk of one of the great decayed beeches; and both the ants and the *Chelifer* occurred under the bark of parts of the tree. Some pieces of the bark had fallen on the nest, and were wholly embedded in it, and on this bark in the nest many of the *Chelifers* were found fully exposed to the ants; on one small piece there were ten individuals, including one young of the first free instar.

Another *Chelifer*, *C. wideri*, was found by Mr. Donisthorpe (1926) in numbers on oaks in Windsor Forest with *Acanthomyops brunneus*, both in the cells of the nests inside the trees, and under the bark. According to Ellingsen (1910) and Hansen (1884) "*Chelifer wideri*" (possibly a *Chelifer* closely allied to it) has occurred in Germany with *Formica rufa*, and in Denmark with *Acanthomyops fuliginosus*. *Chelifer wideri* has been found by me in Sherwood Forest, in Richmond Park, and at West Wickham (Kent), "always under the bark of old oaks; and, unlike other tree-species, it is usually found where the small space between the bark and the wood is choked with a characteristic reddish powdery debris." Mr. Donisthorpe states that this debris much suggests the work of ants, and that at Windsor *A. brunneus* frequently causes

such powdery frass. But no ants were observed by me on the trees inhabited by this species.

As regards *Chelifer scorpoides* and *Chelifer cimicoides* it must be noted that they are not generally or even commonly found with ants. *Chelifer cimicoides* is an abundant forest-species (inhabiting old trees) and *Chelifer scorpoides* generally occurs in manure-heaps, refuse-heaps, etc., quite apart from ants, and often in great quantity. It is evident, however, that these Chelifers—and *Chelifer wideri* together with other Pseudoscorpiones in other parts of the world—are able to make their homes with ants. At least for *Chelifer scorpoides*—the case of *Chelifer cimicoides* may have been altogether exceptional—it is likely that *Formica rufa* nests are congenial abodes, where the shelter and warmth of the nest are fully agreeable, and where the abundant small myrmecophiles doubtless provide an unlimited supply of food. These Arachnids may not be wholly welcome guests; but (probably by force of circumstances) they are certainly tolerated by the ants.

Other Pseudoscorpiones live with bees and with termites. In South Africa the bright-red *Chelifer sculpturatus* inhabits bee-hives and bees' nests in trees. The bees (Fuller, 1901) "take absolutely no notice of the intruders"; and similarly Mr. Donisthorpe's Buddon Wood *Formica rufa* "paid no attention" to the *Chelifer scorpoides* in their nests. When he introduced specimens into his observation-nests "the ants treated them with indifference"; and if a *rufa* worker was forced to take hold of a *Chelifer*, it dropped it at once. Nor does it appear that *Chelifer* ant-guests molest their hosts; though in captivity they may feed on the eggs and larvae of ants, as on any such things. But *Chelifer sculpturatus* in hives (Wells, 1899) sometimes hangs to the legs of the bees; and a *Chelifer* observed in a hive in Europe (Hamlyn-Harris, 1900) appeared to be feared by the inhabitants. In Ceylon (Green, 1908) the ferocious *Oecophylla* ants on tree-trunks may be trapped by the leg by small Chelifers ensconced beneath the bark; the *Chelifer* (not known to feed on the ant) holding on to the leg day after day till the ant dies of starvation. This obstinate holding on to insects' legs is common to many Chelifers, and it extends to *Chelifer scorpoides* which has sometimes been found thus clinging to flies' legs. All Chelifers are formidable and threatening creatures, and their ant-hosts probably adopt a wise course in disregarding them.

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Description of a new Genus and new Species of Noctuidae. Subfamily Ophiderinae.

(Continued from Vol. XL., p. 176.)

By A. E. WILEMAN, F.E.S., and R. J. WEST.

Arthisma pectinata sp.n.

MALE.—*Palpus*: light-buff, dark-livid-brown outwardly and above. *Antenna*: bipectinated. *Head*: frons, lower half light-buff, upper half cinnamon, vertex cinnamon. *Thorax*: patagium and tegula cinnamon. *Abdomen*: cinnamon above and below. *Pectus*: light-buff. *Legs*: foreleg, coxa and femora light-buff tinged with dark-livid-brown, tibia white, dark-livid-brown above, tarsus dark-livid-brown, ringed with white at base, and a white patch above at middle; other legs, light-buff, tinged with dark-livid-brown. *Forewing*: cinnamon, orbicular a small white spot outlined with fuscous; antemedial fascia a faintly marked, fuscous, wavy, outwardly oblique line; a faint fuscous lunule on discocellulars; postmedial fascia a faintly marked, fuscous, crenulate line, excurved to vein 3, straight to inner margin; subterminal fascia a faint fuscous shade, termen straight to vein 4, angled and oblique to tornus, fringe fuscous edged with light-buff. *Hindwing*: orange cinnamon, light-buff at base and on inner margin; below vein 2 the wing is divided, for a short distance in from the termen, forming a blunt tail at tornus. *Underside*: *forewing* cinnamon, the greater part suffused with orange-cinnamon, a white spot on costa postmedially; a patch of cartridge-buff at apex and tornus; a faint fuscous, crenulate subterminal fascia; fringe fuscous edged with cartridge-buff; *hindwing* light-buff, tinged with cinnamon on upper half, a fuscous spot defined with cartridge-buff on costa, postmedial and subterminal fasciae fuscous defined distally by cartridge-buff, faintly marked; an orange-cinnamon spot at tornus. *Expanse* 34mm. (*tip to tip* 32mm.).

FEMALE.—Similar to male, but has antenna ciliated, with paired setae. *Expanse* 34mm. (*tip to tip* 32mm.).

HOLOTYPE. *Male*.—Kolambugan, subprov. Lanao, Mindanao Is. Philippine Is. (plains) 29.V.1914.

ALLOTYPE. *Female*.—Kolambugan, subprov. Lanao, Mindanao Is. Philippine Is. (plains) 20.V.1914.

PARATYPE. *Male*.—Kolambugan, subprov. Lanao, Mindanao Is. Philippine Is. (plains) 28.V.1914.

PARATYPE. *Female*.—Manila, prov. Rizal, Luzon Is. Philippine Is. (plains) 14.XI.1911.

NEAREST ALLY.—*A. scissuralis*, Moore (India, Singapore).

The antenna of male *A. pectinata* is bipectinate with moderately long pectens which are armed with short cilia. From the vertex of each pecten issues a rather long curved seta. The antenna of the female is minutely biciliate with a rather long single seta at each joint on each side of the shaft.

The antenna of male *A. scissuralis*, which very closely resembles *A. pectinata* in wing-facies, is minutely biciliate with shorter single setae at each joint, and somewhat closely resembles the antenna of female *A. pectinata*. The antenna of female *A. scissuralis* is practically the same as male only the setae are shorter.

Mecodina costanotata sp.n.

Female.—*Palpus*: upcurved, light-buff mixed with fuscous. *Antenna*: minutely ciliated. *Head*: frons and vertex light-buff tinged with fuscous. *Thorax*: patagium and tegula light-buff lightly tinged with russet. *Abdomen*: lightly tinged with russet, a series of bone-brown spots laterally. *Pectus*: light-buff. *Legs*: fore-leg light-buff with bone-brown above, other legs light-buff with some bone-brown outwardly, all tarsi fuscous. *Forewing*: light-buff tinged with russet, sub-basal fascia cartridge-buff, wavy, bordered distally by a patch of bone-brown which extends to antemedial fascia; antemedial fascia cartridge-buff defined by a narrow edge of bone-brown distally, excurved to median nervure, excurved to anal vein, straight to inner margin; reniform cartridge-buff, defined by a suffusion of russet proximally, and a suffusion of bone-brown distally; a large irregularly shaped bone-brown patch on costa subterminally, outlined by cartridge-buff, the lower edge reaching vein 4, and a small patch of bone-brown between it and apex; subterminal area below vein 4 suffused with fuscous; four interneural bone-brown spots subterminally, between vein 4 and inner margin; interneural bone-brown spots on termen. *Hindwing*: fuscous-black. *Underside*: *forewing* warm-buff suffused with bone-brown, postmedial fascia bone-brown, excurved; a bone-brown patch on costa subterminally; *hindwing* warm-buff irrorated with bone-brown, a bone-brown spot in middle of cell, a larger bone-brown spot on discocellulars; postmedial and subterminal fasciae bone-brown, serrate, excurved; in subterminal area a series of fuscous-black streaks from fascia to termen. *Expanse* 38mm. (*tip to tip* 37mm.).

Holotype, Female.—Baguio, subprov. Benguet, Luzon Is. Philippine Is. 5000 ft. I.1913.

NEAREST ALLY.—*M. cineracea*, Butl. (Japan, China, India, Assam).

Episparis taiwana sp.n.

MALE.—*Palpus*: snuff-brown. *Antenna*: bipectinated for two thirds, distal third with paired setae. *Head*: frons and vertex snuff-brown tinged with ochraceous-tawny. *Thorax*: patagium and tegula snuff-brown tinged with ochraceous-tawny. *Abdomen*: snuff-brown, tinged with ochraceous-tawny basally, venter cartridge-buff, anal tuft warm-buff tinged with fuscous. *Pectus*: white. *Legs*: fore-legs snuff-brown above, white beneath, tarsus white; mid-leg coxa and femora white, tibia white beneath, patches of snuff-brown above, and fuscous at junction with tarsus, tarsus white; hind-leg coxa and femora white, tibia white with some fuscous at each end, tarsus white. *Forewing*: snuff-brown; antemedial fascia bister, with a white point on costa proximally, and edged with white proximally on lower half, incurved to median nervure, angled, and inwardly oblique to inner margin; orbicular indicated by a fuscous-black spot; reniform, a semihyaline white patch, outlined with bister, upper half defined by a bister shade, lower half by ochraceous-tawny, proximal edge straight, distal edge irregular; between antemedial and postmedial fasciae a suffusion of white on costa, and below the cell tinged with ochraceous-tawny; medially a fine bister line outwardly oblique, touching distal edge of reniform then excurved and inwardly oblique and wavy to inner margin; postmedial fascia bister with a white point on costa and a narrow

suffusion distally, incurved to vein 4, excurved to vein 3, incurved to inner margin; an ochraceous-tawny patch at apex, a white subterminal line from the lower edge of this patch, straight to termen near tornus; terminally, a white line incurved from veins 7 to 5, then wavy along termen joining subterminal line. *Hind-wing*: snuff-brown, postmedial fascia, fuscous, faintly marked, outwardly angled to vein 4; subterminally, a white line, commencing at vein 6, slightly incurved to vein 4, excurved to vein 3, incurved to tornus; a second white line, incurved to beyond vein 4, wavy to tornus, between these two lines a suffusion of white; a streak of ochraceous-tawny on termen from veins 6 to 3. *Underside*: *fore-wing* cartridge-buff lightly tinged with bister, postmedial fascia, a deeply crenulate, bister line, with a suffusion of bister beyond; subterminally an incurved band of cartridge-buff lightly tinged with bister, extending from apex to termen near tornus; bister on termen between veins 7 and 4; *hindwing* cartridge-buff lightly tinged with bister, a fuscous-black spot on discocellulars; postmedial fascia, a faint bister line; subterminal fascia a bister, deeply crenulate, excurved line; a bister patch on termen above vein 4.

Expanse 42mm. (*tip to tip* 41mm.).

HOLOTYPE. Male.—Kanshirei, Formosa, 1000 ft. 14.VIII.1905.

PARATYPE. Male.— " " " " 27.IV.1908.

NEAREST ALLY.—*E. liturata*, Fabr. (India, Ceylon, Burma, Andamans).

(To be continued.)

Collecting. 1928.

By H. B. D. KETTLEWELL, F.E.S.

CORRECTIONS:—p. 7. for *Noctua castanea* read *Phragmataecia castaneae*.
p. 8. for *B. roboraria* read *B. consonaria*.

On July 28th Dr. Cockayne, Mr. Worsley Wood and I motored down to the Broads and under their supervision I succeeded in taking pupae and larvae of *Nonagria cannae* together with some of *N. typhae*, but both species had been very much depleted by moorhens, which had worked havoc among them. That night we took *Leucania brevilinea*, *L. straminea*, *L. phragmitidis*, *H. leucostigma*, etc., and also observed full fed larvae of *Saturnia paronia* and *Arsilochia alborensa*. The following morning starting at 5 a.m. we took large numbers of *Papilio machaon* larvae, nearly all of which were full grown. The same day (the 29th) we motored down to Woodbridge district. Here I was lucky enough to take a fine pair of *Hyloicus pinastri* on a pine trunk and Mr. Worsley Wood took another male a short distance away. Our success was directly due to Dr. Cockayne's work in this district a few years ago when he found this insect locally in certain small areas among the miles of pines, which had proved barren for this species.

August 4th was spent at night at Wicken; a poor night. However *Coenobia rufa* was common and *Tapinostola hellmanni* was taken.

The following day on our local chalk *Polyommatus coridon* was flying in countless thousands—I took two semi-striated females, but varieties were scarce. *Hipparchia semele* and *Gonepteryx rhamni* were about, the former in some numbers. Larvae of *Euphygia (Anticlea)*

cuculata and *Macroglossum* (*Sesia*) *stellatarum* were taken on bedstraw and I picked up a good series of *Fremobia ochroleuca* on the flowers of knapweed.

On the night of August 6th I motored over to Wicken arriving late; it was very warm and dark, and turned out to be the busiest night I have ever had at this place either at light or at sugar:—*Leucania impudens*, *L. straminea* and *L. phragmitidis* swarmed at sugar, together with numbers of *Helotropha leucostigma*, and in fewer numbers *Catocala nupta*, *Apamea ophiogramma*, *Agrotis tritici*, *Thyatira batis* and one *A. strigula* (nearest heather about 7 miles distant). Light was almost equally attractive:—*L. straminea*, *L. phragmitidis*, *L. impudens*, *C. rufa*, *Epione repandaria* (*apiciaria*) and *Lithosia griseola* were in numbers—and the same night I took a nice variety of *Eutricha quercifolia*, which, I believe, is referable to var. *laticolor*; also one belated *Metiana flammea*—the latest date I have ever heard for this species. I also picked up one or two pairing *A. alborenosa* on the grass, these being probably representatives of the second brood.

On the night of August 11th Mr. Worsley Wood and I returned to our *concolor* locality mentioned earlier. It was an exceedingly hot, still night and was conspicuous for its lack of insects both at sugar and headlights. The only species we took in numbers was *T. helmanni* (one at sugar) and it seemed to have much the same habits as its near relative *concolor*, occurring in precisely the same spot and flying freely between 2 and 3 a.m.

On August 20th I went to stay with my friend Mr. Demuth at his home at Southbourne, Bournemouth—at night in Poole we turned up *Laphygma exigua* (a good few sitting on grasses), *Agrotis agathina*, *A. cursoria*, *A. praecox* (2), *Leucania litoralis* and a beautiful silvery form of *A. vestigialis* (common). At sugar in the New Forest (or rather near it) we took *Catocala promissa* (fifteen in one night) and *C. sponsa* (a few); they seemed to keep on arriving at the patch right through the night—also *Noctua castanea* var. *neglecta* (8). *Colias croceus* was common on Hengisbury Head but I only saw one ab. *helice*.

On August 28th I was at Folkestone again. *Polyommatus thetis* was swarming in tremendous numbers on the Downs as also was *C. croceus* but I saw no ab. *helice* curiously enough.

On August 29th I found larvae of *Heliothis peltigera* literally swarming on *Senecio viscosus* on the shingle at Dungeness and also with the aid of a lamp at night near Hythe. No imagines were, however, seen, though sugaring on the spot where the larvae swarmed was resorted to. In common with many of my friends I have lost a great number of these by keeping the pupae slightly damp instead of dry.

On September 1st I went down to South Devon for my usual attempt after migratory species. There seems to have been a much larger percentage of var. *helice* here than in the former places I visited and 16 were taken in one day, September 10th. A few *H. peltigera* were seen on the wing in the day time.

Owing to the kindness of Mr. Millman and his father who gave up their sugaring patches to me, where they have sugared for at least the last thirty years—I had some very exciting times at sugar: *L. exigua* was extremely abundant and on the night of September 13th I took over 40; after this date only 2 others were taken. On September 10th I was fortunate enough to capture freshly hatched *Leucania unipuncta*

and on the 20th a male *Heliothis armigera*, which I sacrificed for eggs for one night in spite of its sex! *L. vitellina* turned up early on September 5th. Only one *H. peltigera* appeared at sugar the whole month. *Orthonama obstipata* (*fluvata*) also turned up (on one night only) when 3 were taken at sugar. A large series have since been bred.

Dianthoeecia luteago race *barrettii* this year was extremely scarce (in contrast to 2 years ago). I only took 2 pupae after a very long search. I have previously taken as many as 9 in half an hour at the same spot.

Since returning from Devon I have bred out a few *L. erigua* from eggs deposited and their life-history from egg to perfect insect was passed in 35 days, which equals if not beats the shortest record for *O. obstipata* (*fluvata*).

Easter 1926, 1927 and 1928 in the South of France—Lepidoptera.

By Wm. FASSNIDGE, M.A., F.E.S.

(Concluded from page 6.)

The following rare species were also taken :—*Polygonia egea*, Cram, Carnoules ; *Syntarucus telicanus*, Hb., Cavalaire ; *Hyphoraia testudinaria*, Fourc., a few larvae at Carnoules ; *Proeris micans*, Freyer, at Cavalaire and Carnoules ; *Synanthedon respiformis*, L., larvae locally common in stumps of cork oak, but heavily parasitised, while I have never bred a single parasite from larvae of this species in England ; *Nola chlamitulalis*, Hb., Cavalaire ; *Hyphilare loreyi*, Dup., Cavalaire ; *Caradrina selini*, Boisd., Carnoules ; *Apopestes limbata*, Stgr., Carnoules ; *Synthemia jiva*, Fb., Cavalaire and Carnoules ; *Amephana aurita*, F. (dejeani, Dup.), Carnoules ; *Exaereta ulmi*, Schiff., Cavalaire ; *Dianthoeecia silenes*, Hb., Cavalaire ; *Dyscia lentiscaria*, Donz., Carnoules ; *Lithina partitaria*, Hb., Carnoules ; *Itame vincularia*, Hb., Carnoules ; *Strenia plummistaria*, Vill., locally common, Carnoules ; *Rhoptria asperaria*, Hb., and ab. *pityata*, Rmbr., with every possible intermediate form at Carnoules, rare at Bormes ; *Lycia hirtaria*, Cl., race *diniensis*, Obrth., Cavalaire and Bormes ; *Ephyra mupillaria*, Hb., scarce and variable in all three localities ; *Eupithecia irriguata*, Hb., Bormes ; *Cidaria basochesiata*, Dup., Cavalaire ; *Evergestis frumentalis*, L., Carnoules ; *E. politalis*, Schiff., Carnoules ; *Pionea numeralis*, Hb., Cavalaire and Carnoules ; *Titania pollinalis*, Schiff., ab. *guttulalis*, H.-S., Cavalaire and Carnoules ; *Brephia compositella*, Tr., Carnoules ; *Tortrix rigana*, Sodofsky, Carnoules ; *Myelois obliqua*, Zell., in all three localities ; *Acrolepia consequana*, H.-S., Cavalaire ; *Stigmonota dorsana*, Fb., in all three localities ; *Oryptilus distans*, Zell., larvae on the sea shore, Cavalaire ; *Choreutis bjerkanndrella*, Thnbg., Cavalaire.

Two Trips to Central and Southern Spain.

By P. HAIG-THOMAS, F.E.S.

I was fortunate enough to be able to spend a considerable part of this summer in Spain and I publish the following notes hoping that other entomologists may be attracted to this most interesting country. Undoubtedly there are local races and possibly still new species to be discovered by those who venture into the many unexplored Sierras.

The following are the dates on which I stayed at the different localities I visited.

Albarracin, from May 31st to June 19th and from July 27th till August 9th.

La Granja, from July 8th-July 15th.

Granada, July 16th-18th and from July 23rd-26th.

Hotel Sierra Nevada above Guejar, July 18th-23rd.

At Albarracin in June the weather was rather cold and windy, especially in the Gorge above and below Santa Croche. High up the Val de Vecar (mistakingly called Val de Vegar by the early visitors to Albarracin) there were several good butterfly corners, fairly sheltered. During my two visits to Albarracin four trips were made to the Sierra Alta above Noguera, but of these four days spent collecting there three were spoilt by bad weather. At La Granja I was unfortunate in being there during a week of thunder-storms, in consequence of which I was only once, and that on my last day, able to visit the summit of the Picos de Peñalara, about 7400 feet, the highest point of the Sierra de Guadarrama.

Of the five days collecting at Granada two were spent on the ridge behind the Alhambra, but the country was too dried up at this date and the only insect of interest obtained was a series of *Strymon quercus* v. *iberica*, on the line of evergreen oaks at the summit of the ridge.

From the Hotel Sierra Nevada it is necessary to climb some 3500 feet before the nearest summit of the Loma de San Geronimo is reached. Here three at least of the insects peculiar to the Sierra Nevada are to be found. From the Loma de San Geronimo the Picos di Valeta over 11000 ft. can be reached up a long but gentle slope, but at the end of July butterflies appeared to be confined to under 8000 feet.

No where in the Sierra Nevada did I find a butterfly corner, but at certain places at Albarracin, La Granja and in the Sierra Alfacer butterflies were almost as abundant as in the Eaux Chaudes valley at Digne.

The following insects were taken.

P. podalirius v. *feisthameli*:—Not common in Albarracin and those met with were mostly worn. In the Sierra Alta it was fresh and common in the first half of June. The summer brood was just emerging at Granada when I left.

P. machaon:—Not uncommon at Santa Croche (Albarracin) in June and a few of the summer brood were flying on the ridge behind Granada in July.

Zerynthia (Thais) rumina:—I doubt whether this insect occurs at Albarracin; the form which is very closely allied to *medesicaste* was common and still fresh in the upper part of the Val de Vecar on June 7th. On June 18th the males were flying commonly on the summit of Sierra Alta, but only two females were observed.

Parnassius apollo race *aragonicus*:—Larva full grown and abundant on the summit of the hills on the top of the Val de Vecar on June 7th. On June 18th the males were flying commonly on the summit of the Sierra Alta, but only two females were observed.

P. apollo race *escalarae*:—I obtained two freshly emerged males and saw another equally fresh at about 5600 feet, just above the tree line on the Pico de Penalara at La Granja; apparently they were only just emerging. These *apollo* differed when captured from those taken in

the Sierra Alta owing to being slightly smaller and the ground colour being of a more creamy white. Both forms have very narrow transparent margins to the forewings and those from the Sierra Alta are exceptionally large. Larvæ were common early in June high up the Val de Vecar.

Aporia crataegi:—Abundant at Albarracin in June and still flying at La Granja in July.

Pieris brassicae:—common at Albarracin in June, not seen anywhere later.

P. rapae:—everywhere.

P. napi:—One specimen was taken by Commander Wyndham Forbes, D.S.O., in the Sierra Alta on June 9th. I took a pair rather worn on the Pico de Penalara at La Granja in July.

Var. *dubiosa*:—I was lucky enough to capture a dozen specimens of this insect on the swampy ground near the farm where the ash trees grow and which is the best locality for *Laeosopis roboris*. The insect though not common was well out and in fine condition. It was however not easy to catch, partly owing to its rather rapid flight, and partly to the swampy treacherous nature of the ground where it flew. The green on the veins of the underside so typical of *P. napi* is almost obsolete and is confined to the basal half of the centre vein on the underside of the hindwings. The insect is also larger and the forewings are much broader than in *P. napi*.

Pontia daplidice:—Abundant everywhere in successive generations.

Euchloe cardamines v. *meridionalis*:—Common locally in early June at Albarracin, especially in the Val de Vecar.

Gonepteryx rhamni:—Everywhere.

G. cleopatra:—Everywhere, except in the Sierra Nevada.

Colias hyale:—Everywhere, but not very abundant.

C. croceus:—Common everywhere.

Leptosis sinapis:—At Losilla and Sierra Alta (Albarracin) in June and end of July; also local but not common at La Granja in July. Common locally in the Sierra Alfacar and also in the Sierra Nevada in July.

Erebia stygne:—On July 9th I found *E. stygne* on the hills two miles South-East of La Granja at about 4800 feet. Both males and females were well out and some rather worn. At 5500 feet on the same day a much larger form occurred and on comparing them with Dr. Chapman's *bejarensis* I find the largest which I took of this form to be larger than any of the *bejarensis* in the South Kensington Museum. On the Pico de Penalara the smaller form or *penalarae* was flying here and there from 4500 feet in the timber to the top of the mountain at over 7000 feet, all perfectly fresh. This insect was similar to the smaller form found on the first day. Apparently *bejarensis* and *penalarae* both occur on the same hills or are they variations in size of the same race?

E. erias v. *hispanica*:—This insect was common in one locality on the Sierra Alta and occurred spasmodically in several others; unfortunately the best locality was not found till June 15th, when many of both sexes were already past their best. I covered much ground at Losilla, but failed to find it.

E. epistygne v. *virithus*:—Widely distributed and sometimes common on all the higher limestone hills around Albarracin, where it

flies on identically the same ground as the type does in Provence. I took a few moderately fresh of both sexes at the beginning of June.

E. tyndarus v. *nevadensis*:—This fine *Erebia* was common and very fresh from 5500 feet-7000 feet on the Loma de San Geronimo in the Sierra Nevada. A magnificent form, not unlike *E. tyndarus* v. *pyrenaica* from Luchon, but much larger; it was getting worn by July 23rd and was shy and always difficult to catch.

Melanargia lachesis:—First appeared at Albarracin on June 17th. Here and at Granada the form was considerably smaller than the magnificent form at La Granja. A few of female ab. *catuleuca* were taken.

M. japygia v. *cleante*:—Very fine and large at La Granja in July. At Albarracin the species was already worn and a good deal smaller. This race has been named v. *aragonensis* (Sag.).

M. syllius:—One ♂ half a mile below Santa Croche, fresh, June 16th.

M. ines:—First taken in the Val de Vecar, June 11th. Later common there and at Santa Croche. I saw a single fresh *Melanargia* at 7000 feet on the Sierra Nevada on July 22nd, which I am almost sure belonged to this species.

Satyrus circe:—Everywhere. Ribbe mentions that he only saw it once in Andalusia. It was, however, common enough on the North side of the S. Alfacar below the Forester's house. I did not take any as large as those found in Provence.

S. alcyone:—A large form was just emerging at La Granja when I left. The form *andalusica* was common, but nearly all were worn on the S. Alfaca on July 16th. It was fresh and larger in the S. Nevada, but not so common. At Albarracin *S. alcyone* was all but fresh and abundant. It has been named v. *bifrania* (Fruhst.) and approaches the central Pyrenean race.

S. briseis:—At La Granja it was only just emerging when I left. In Andalusia it was still fresh everywhere when I left. The specimens appear to be identical with v. *meridionalis*. At Albarracin flies *S. briseis* v. *laraca* (Zapt.), the white band is rather broader and the insect somewhat smaller than *meridionalis*. Though widely distributed it was not common this year at Albarracin.

S. priouri v. *iberica* (Obthr.):—Extremely common above and below Santa Croche at Albarracin, the female form *uhagonis* being almost as common as the type. The insect was fully out on July 28th, most males being passed their best.

Hipparchia semele:—Abundant everywhere; first taken at Albarracin on June 16th, and still fresh there on August 9th.

H. hippolyte:—Not uncommon in its flight places between 5500-7000 feet on the Loma de San Geronimo in the Sierra Nevada. Found chiefly near or on the top of the ridge on small stoney plateaux sparsely covered with tufts of grass to the exclusion of the numerous low growing prickly plants, which cover most of the slopes. The butterfly resembles a small *Oeneis aello* both in flight and colour at rest, but is much easier to catch. It is difficult to obtain perfect specimens especially of the females. It was well out on July 18th.

H. arethusa v. *boabdilla* and v. *obscura*:—Local in the S. Alfacar; a few males taken on July 24th. On July 26th males were common

(about one in ten being *v. obscura*) and two females were obtained. This insect is certainly the most beautiful form of *H. arethusa*.

H. arethusa v. galatia (Zapt.):—Albarracin; a small form rather darker than the Provence race. Locally common in the Val de Vecar and on the road to, and at Losilla, females just emerging August 4th.
(*To be concluded.*)

The Asiatic origins of the Western Palaearctic Rhopalocera exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

Several writers have of late already deplored the unfortunate way in which Staudinger has erected names for some European variations of this species, basing them on a few words of description, which apply equally well to many forms in reality perfectly distinct from each other by characters he failed to grasp, because they evidently were beyond the spirit and knowledge of his times. His confused state of mind in this respect is shown by the way he shifted the references from one name to the other in the three editions of his *Catalog*. It seems to me, however, that, if one takes the trouble to do so, one can very well restrict the meaning of his names and define them in such a way that they can be worked into the present knowledge we have acquired on this subject. I have been striving for some time to collect the necessary materials and I believe I now have before my mind a tolerably good picture of the distribution of the various races in Western Europe, so that the time has come to attempt a rational classification and to draw a few general conclusions of some interest. If other Palaearctic species had not afforded a much clearer view of their lines of migration and of the exerges, which have been produced in the various regions they have reached, it would no doubt have been difficult to get an idea of them from *didyma*, but now, we know something about them, the facts one observes in it evidently indicate that its behaviour in the past has been in accordance with the general rules and similar to that of other *Melitaeae*. One can, in consequence, deal with it by grouping its races under the heading of, more or less, the same exerges, but one must bear in mind that these are very probably much less highly differentiated than, for instance, the corresponding ones of *M. aurinia*, on account of the far greater organic elasticity of *didyma*, enabling it to adapt itself individually to extremely different surroundings so that it has not had to split into groups with widely different constitutions, each suited to particular conditions. This is proved by the much greater differences in the morphological features of the spring and of the summer emergences of some races, than in those of the races when compared with each other. For the same reason it has never thrown out a local satellite species after its arrival in the extreme west, like *aurinia*, *phoebe* and *athalia* have done under the stress of heat, drought and parched food. As a matter of fact, *M. didyma* and more particularly *trivia* and *saxatilis*, not to speak of *acraeina*, which is culminating in this sense, have no doubt, been evolved especially to stand conditions of this sort, as well as a very variable climate, because they have originated in Asia, later than the rest of the genus. One can trace back the evolution of the *Melitaeae* in a satisfactory way as having

arisen from the American tropical and sub-tropical genus *Phyciodes*, some species of which pushed northward into a temperate climate, like they are still doing at the present day, and transformed their constitutions accordingly. Some *Phyciodes* of North America obviously exhibit chiefly, on the upperside, the features of the various groups of *Melitaea* and strongly suggest that each of the latter may have evolved from a different one of the former, except in the case of the *didyma* group, which has, as far as I can make out, no representative in America and no *Phyciodes* recalling either its general aspect or its characteristic feature. This I take to be the reduction on the underside, to internervular dots, of the crescent-shaped premarginal streak of the other *Melitaea*. It is noteworthy that this characteristic is in no way a new development, but, to a certain extent, a return to a sort of marking familiar to us in the *Lycanidae*, and present in several *Erycinidae*, although in the latter families the premarginal dots have a different origin and correspond to the black dots in the orange band of *cinxia*, whilst in *didyma* they are produced by a more external part of the pattern which has been developed by the *Nymphalidae*. I think one can safely maintain that the *didyma* group, including *trivia*, *saratilis*, *acraeina* and probably *romanori*, have been wholly produced as a result of the influence of Asiatic surroundings. Seitz, in his *Fauna Americana*, p. 434, states that the underside of *M. minuta*, Edw., is so similar to a small *didyma*, one must consider it its American representative. This I cannot agree with at all. It corresponds, if anything, to *arduinna*, Esp., and it still stands very close to *cinxia*, L., by the shape of the wings, the general pattern and the black dots in the orange band of the hindwings. In the high mountains of Western China, instead, there really exists the species (*agar*, Obth.), which is a perfect transition from *minuta* to the *didyma* group and which already distinctly belongs to the latter by the shape of the wings and the general pattern, including the internervular premarginal dots, although the underside still recalls *minuta* and retains its dots in the orange band. The process of variation, which has produced the *didyma* group, did not, however, stop at this grade of transformation of the transverse bands into rows of spots: in *M. yuenty*, Obth., it is carried further and it culminates in the remarkable Chinese genus *Timelaea* with a leopard-like spotting on the whole of both surfaces.

As this line of variation is entirely absent from America we can presume there were no *didyma*-like species in the great Arctic continent, with a temperate climate, where we believe the genus *Melitaea* originated, together with most of the other principal Holarctic genera, during the Secondary Ages, when Siberia and Alaska were tropical, and we can presume that the *didyma* group originated from the Asiatic portion of the *cinxia* group, after it was driven southward by the onset of the cold period of the end of the Cretaceous and of the beginning of the Eocene. The Lepidoptera certainly sustain admirably this "north Polar theory" of Wallace and the facts one observes in the distribution of the Holarctic genera all over the world compel one to believe in a vast migration, which carried some of them even across the equator, along the tops of the mountain chains which stretch from north to south, as far as Patagonia and New Zealand and, under more modified forms, probably also South Africa. The lines of this migration, which included *didyma* and its nearest allies, are the west-

ward ones from Eastern Asia. The origin and the distribution at the present day of most Palaearctic species is due to them and to their having been split into several lines and stopped at intervals, during long periods of time, in various regions by a chain of inland seas, which separated Siberia from the great Pamiro-Thibetan island, Russia from Anterior Asia, Central Europe from the Balkans and Western Europe from Africa.

Some time after the marked change of climate at the end of the Cretaceous had transferred the flora and fauna of the Arctic continent into Eastern Asia, an isthmus joined the eastern end of the Pamiro-Thibetan island to western China and chains of islands emerged from the Han-Hai sea, which covered most of the Eastern Turkestan and of Thibet, stretching across that sea from east to west, as shown by the mountains they have turned into at the present day. The species, which had been stopped in the south-west of China by too hot a climate further south, availed themselves of this outlet and spread westward. Their numbers must already have been considerably increased at that time by their new surroundings in China, as compared with their ancestors, which had come down through Siberia, and since then those that remained in China have obviously multiplied and transformed to an extraordinary extent, producing even many local genera. The lot, which had invaded the Pamiro-Thibetan island, found itself trapped to the north by the Han-Hai sea and to the west by the Aralo-Caspian, which was continuous with the Indian Ocean and with the Arctic ocean, and which was connected to the Han-Hai by two broad arms: the Ferghana-Kashgar and the Dzungarian, with the Thian-shan, as an island, between them. I insist particularly on these geographical points, because it seems to me one can trace back to them the origin of many variations of the Lepidoptera even in Europe. The uplift of the land, which connected Thibet to China, also produced a chain of islands between the Thian-shan and the latter, still existing now as mountains separating the Eastern Turkestan from the Gobi desert. The impulse to a westward migration soon populated the Thian-shan this way from about the same stock as the Pamiro-Thibetan island and created a condition similar to that we can see in the Malay Archipelago, of closely allied, but different, species and exerges in each of those two large islands. This important observation has been made on the spot by Groum-Grshimailo. A third centre of different species and exerges originated on the continent, north of the Dzungarian channel from the migrations, which took place from the N.-E. of Siberia towards the S.-W. and which were compelled to stop along the shores of the Han-Hai and of the Aralo-Caspian seas; the soft maritime climate they found there has apparently been sufficient to save them through the coldest period, but they never have developed into such numerous and differentiated species as their companions, which reached further south by the longer routes, through China. This geographical state of things remained more or less unaltered from the end of the Eocene to the beginning of the Miocene, *i.e.*, close on one million of years, during which the prevalent climate was tropical again, so that most of the species of northern origin must have been obliged to break up into groups in seeking refuge in the various mountain chains, which were then gradually developing their present huge and lofty masses. It is not

to be wondered at that in similar conditions and during such a long period of time a large number of species and even some genera, with striking features, should have come into being in those regions, so that the naturalists of last century credited the legend that the Pamir had been the cradle of humanity and of the greater part of animals and plants. Groum Grshimailo has striven to prove it by the Lepidoptera, in the vol. IV of Romanoff's *Mémoires* (1888), and he has personally made many very interesting observations, but, in reading through his work, it is instructive to note that the facts which puzzled him and which he tried to explain by complicated theories are those which simply suggest the arrival of an original stock to the Pamir and to North America from a common source, such as the arctic one of Wallace's North Polar theory. Groum's efforts to establish his *marcopolo* of the Pamir as the ancestor of all the American *Colias* are quite childish, considering the obvious and enlightening examples this genus affords of the gradual development and radiation of gaudy species in Asia and in America from the arctic *pelidne* and *nastes*, so that *marcopolo* can only be a descendant of *pelidne*, parallel to *palaeno* and representative of the latter in Central Asia. One sees one can never be too careful in attempting to establish the locality of origin of a genus, when one considers such cases as the *Baltia*, which live at great altitudes, where one might have thought they must have originated, whereas, on the contrary, one finds there exist exact representatives of both its species at similar altitudes in the Andes, so that one can only conclude, reasonably, they have travelled an enormous distance from their place of origin in the Arctic continent and they are amongst the oldest and most stable Holarctic butterflies in existence.

(To be continued.)

The caterpillar and pupa of *Opsiphanes invirae* sub-sp. *amplificatus*, Stich.

By KENNETH J. HAYWARD, F.E.S., F.R.G.S.

Larva.—A bright green slug-like larva 60mm. in length including the anal horns.

A squarish head approximately $6\frac{1}{2}$ mm. long by 5mm. in width and about 2mm. thick, clothed posteriorly above the face with short greyish hairs pointing forwards, and at either forward corner two or three larger longer blackish setae. The head behind with four reddish horns projecting backwards, the dorsal pair 1mm. long with a black dot on the inner base of each, the outer pair half the size. In colour the head is green suffused with reddish, four darker lines running from the four anterior horns to frons.

Body pea green covered with minute greenish white specks, the alimentary channel showing dark green with a thin purple line, a pair of parallel, slightly darker, green lines on either side and on the thoracic segments a thick, broken, purple-brown line level with the spiracles which appear on it yellow. Immediately below the dark stripe light yellowish white and beneath greenish to greenish-white. Two horns projecting straight backwards from the anal segment in colour slightly more yellowish green than the remainder of the body. Forelegs tipped chocolate, the spiracle on the first segment orange-red. Found

on a wall at Villa Guillermina, Province of Santa Fé, Argentine, July 15th, 1928.

Foodplant not identified but given by Seitz (*Macrolep. World*) as "feeds on *Giriva* leaves." Seitz also notes that imago hides in Palms. A freshly emerged specimen was taken sitting on its pupa-case in a small ornamental palm at the same place as the larva on July 17th.

Pupa.—A stout angulated light green pupa closely resembling a small green leaf. Each wing-case angulated with two ribs, the apexes of which is brown or yellowish, a golden spot terminating the costal rib. Antennae, dorsal rib, etc., of the pupa dull brownish, whole pupa "veined" with fine brownish lines which are not very apparent till after emergence, but show up well on the whitish empty case.

Imago and pupa case have been sent to the B.M.

NOTES ON COLLECTING, etc.

In the *Vasculum* for February Messrs. Carter and Heslop-Harrison name another form of *Plebeius* (*Aricia*) *medon* as ab. **garretti**, characterised by "Uppersides, black discoidal points of forewings margined with white; hindwings, discoidal points white as in ab. *quadripuncta*: undersides typical." A further form is named ab. **codrus** characterised as "Inward from what is usually the innermost row of four ocellated spots, and on the margin of the wing, is a single additional spot with black pupil." A third aberration, consisting of "The retreat of the outer row of ocellated spots to the subterminal red lunules with their coalescence among themselves to develop a continuous band" is named ab. **artabazanes**. Specimens in which the usually red lunules on the uppersides of the wings (also below) become dark chocolate colored are named ab. **hippolyte**.

CURRENT NOTES AND SHORT NOTICES.

The Hon. Treasurer would be obliged if more subscribers would bear in mind that subscriptions are payable in advance. If a larger proportion would pay during the first three months of the year, it would save both time and expense. He would also like to see a greater number take advantage of the opportunity of paying through the Bankers; forms for this purpose can be obtained on application.

In referring last month to the separates sent by Mr. R. S. Bagnall on Thysanoptera a very interesting fact in part 3 might be mentioned. There is a description of a new species, *Holarthrothrips tenuicornis*, which is the first living example of the superfamily, and its nearest relative is a fossil species described from amber.

The *Canadian Ent.* for November contains an article on the Canadian Butterflies which should be of considerable interest to British entomologists. It is by J. McDunnough and deals with species very closely related to our own, *Pieris beckeri*, *P. sisymbrii*, *P. napi*, *Anthocharis sara*, *Eurymus* (*Colias*) *emilia*, *E. (C.) nastes*, *Caenonympha inornata*, *Brenthis myrina*, *B. freija*, and *B. polaris*, several of which have in the past been considered as co-specific with European species.

The *Revue Russe d'Ent.* 1 & 2, 1928, contains a large amount of matter in its 136 pages, with a considerable number of figures. There is an obituary of the late Herr Jacobson the traveller and explorer. Several new Agrotid species are described from Central Asia. There is an interesting article contrasting the forewing veins and the scales in the males of the five North American species of the genus *Hybernia*.

The *Ent. Zeit.* of Frankfort-on-Main is another magazine, which gives the more comprehensive contributions as a supplement. Of recent years three such serials have been issued. (1) The plants of Europe with lists of the Macro-Lepidoptera which will feed in nature upon each. (2) and (3) Two volumes of a Handbook of Practical Entomology, summarising for each genus details as to copulation, oviposition, larval structure, diseases and habits, food plants, pupation, pupal structure, parasitism, hibernation, etc., etc., in the Rhopalocera and the first portion of the so called Bombyces. At the present time a further volume is in progress of issue, a continuation of the Bombycid genera. Especial emphasis is given to all genera which contain species economically important from their destructiveness to vegetation.

The *Ent. Rundschau* has contained recently a series of articles on the Nomenclature used in Seitz works by Dr. Seitz himself, and an article on the Agrotid *A. subrosea* as it occurs on the continent, particularly in the neighbourhood of Hamburg.

Eos: Revista Española de Entomología, Vol. IV. pts: 1, 2. This publication is becoming one of the more important serials of the continent of Europe for the study of Entomology. It is gratifying to know that the Museo Nacional de Ciencias Naturales of Madrid has been able to enlist such a number of able specialists in entomology. The two parts before us consist of 260 small quarto pages with 5 plates and some 50 text figures. The articles are in Spanish, English, German and French, and deal with Orthoptera, Hymenoptera, Coleoptera, 3 each, Rhynchota 2, Diptera 1 and Collembola 1.

We much regret to record the death of Dr. Josef Franz Berger of Vienna, who for thirteen years has been one of the strong supporters of the Oesterreich Entomologen Verein and of its monthly Zeitschrift. We remember him as a pleasant correspondent for some years past.

The *Zeit. Oesterr. Ent. Ver.* in the last few numbers contains several articles of general interest to students of European Lepidoptera. A new Lycaenid species is described from Spain, allied to *Plebeius orbitulus* from which it is differentiated by the androconia and its general appearance both on the upper and underside, as is clearly exhibited in the plate accompanying the article. There is an analysis of the markings and their variability on the underside of the hindwings of *Melitaea didyma*. The breeding from the egg of *Dasypolia templi* is described. A faunal List of Lepidoptera of the Mährens is in progress. A number of new species and forms of Lepidoptera are announced and described by Herr Schawerda including ab. *punctifera* of *Erebia zapateri*. The same author commences an account of his four journeys to Corsica and describes the numerous new forms of Lepidoptera he met with including v. *corsivola* of *Bryophila perla*.

The *Boll. Soc. Ent. Italiana* appears regularly now and contains a considerable amount of matter on the Coleoptera of Italy. A very useful feature is a record of all articles which are published dealing with the fauna of Italy and of the Italian Mediterranean colonies.

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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should
be sent to Mr. Hy. J. TURNER, "Lateamar," West Drive, Cheam.

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.*

Duplicates.—Fine bred *prunaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—*Rev. G. H. Raynor, The Lilacs, Brampton,
Huntingdon.*

Duplicates.—*Strangalia auralenta* (Col.). Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list
sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—British Noctuae and forms.

Desiderata.—Pupae: *opima*, *populeti*, *incerta*, *gracilis*, *capsophila*, and many
others.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first
class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of
the World.

Galls.—In view of the forthcoming Monograph on British Zoo—and Phytoecidia by
Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant galls
are requested. Material will be willingly identified, acknowledged, and, where necessary,
illustrated. Address such to: *Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong
College, Newcastle-on-Tyne.*

Wanted loan of series of *E. jurtina* (unusual aberrations not required) from East
Anglia, N. and S. Wales, Northern England, Scotland (E. and W. sides), and Connaught,
for study of geographical variation.—*P. P. Graves, F.E.S., 5, Hereford Square, London,
S.W.7.*

FOR SALE £1 1s. (pub. £2 2s.): Part I. of Trans. Ent. Soc. London, 1928; containg
inter alia Mr. C. J. Wainwright's complete monograph on the British Tachinidae (Diptera).
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CHANGE OF ADDRESS.—*K. J. Hayward from La Forestal Ltda., Villa Ana, F.C.S.Fé,
to the English Club, 25 de Mayo 586, Buenas Aires, Argentine.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. March 6th.

The South London Entomological and Natural History Society, Hibernia
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
February 28th. March 14th.—*Hon. Sec., Stanley Edwards 15, St. German's Place,
Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London
Entomological and Natural History Society and the North London Natural History
Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and
third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—
Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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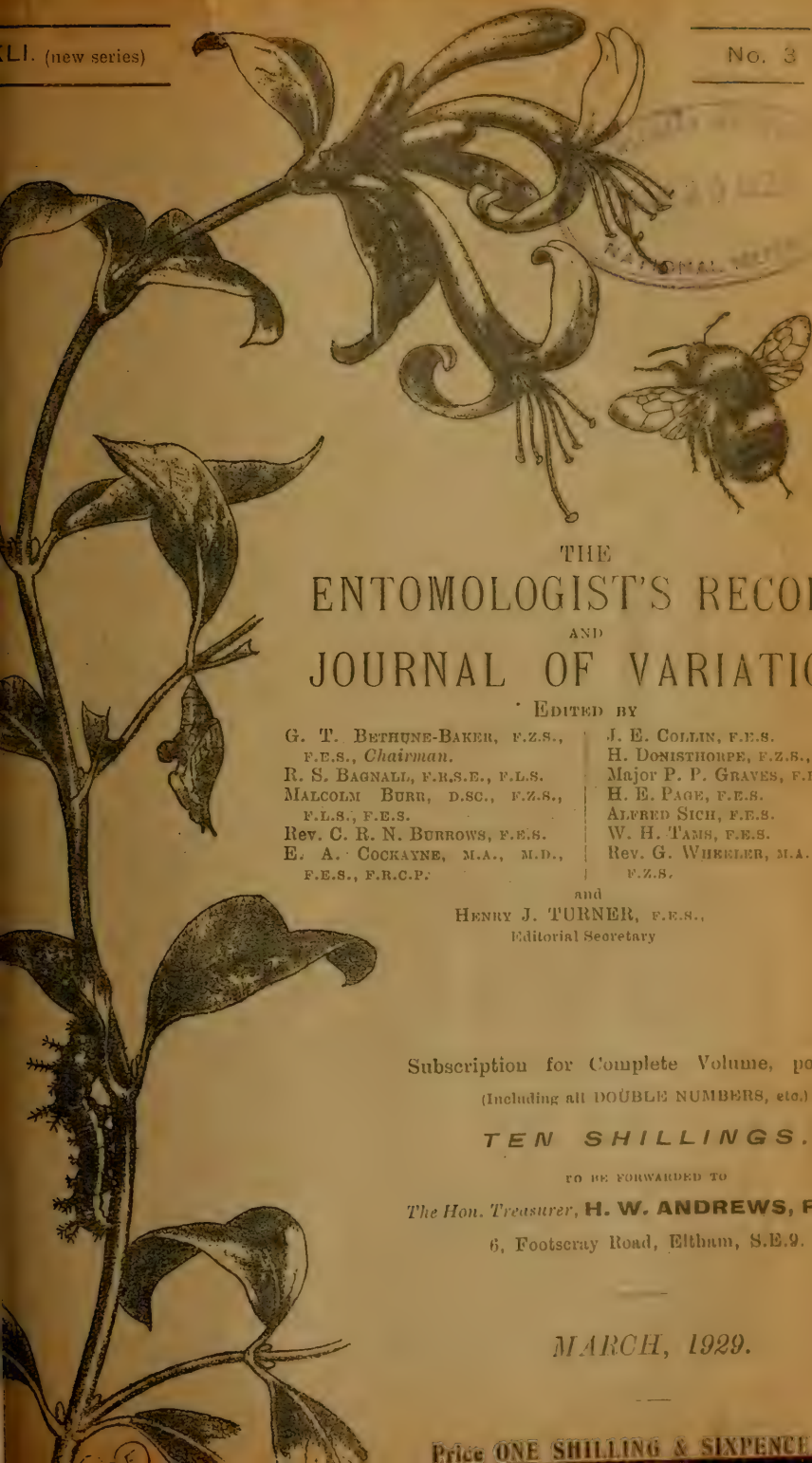
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Wyre Forest Area. I. Diptera.

By C. J. WAINWRIGHT, F.E.S.

My friend Mr. Bethune-Baker in an Editorial on page 49 of Vol. XXXVIII. of this magazine announced these papers upon the Insect Fauna of Wyre Forest with some kind and flattering but rather embarrassing remarks. So far, at least, as I am concerned it is unfortunately not correct to say that I "know every yard of the old forest," and, moreover, it is many years now since I paid more than a very rare and fleeting visit to it. Indeed, I have really worked there very little since I began to take a serious interest in Diptera, so that my knowledge of the Forest, so far as the present purpose is concerned is very slight. Mr. R. C. Bradley certainly worked there more than I did, but all his collecting was done a long while ago and was of a very general character. Of other Dipterists the late Mr. G. H. Verrall paid at least one visit, and Col. Yerbury did the same; but the latter collector was not greatly impressed with the richness of the insect life of the district and so did not give it more than a trial; and the total result is a very superficial knowledge of the dipterous fauna.

So incomplete is the information resulting from our joint efforts that I am not in a position to attempt anything like complete lists of the species occurring in the Forest,—it would be useless to publish full lists of those Diptera which we do happen to have taken or observed, as they would be too scrappy to be of use, and consist for the main part of more or less ubiquitous insects the record of which would interest no-one.

Obviously too, in view of the proposed changes in the character of the woodland, that information would be the most important which would throw light upon insects especially related to the particular type of flora which is going to be affected; but so little is known of the life-histories of Diptera that with the slender knowledge we possess of the local species, no conclusion can be drawn. To be of real value this paper should be ecological, but as it is, all I can attempt is a slight indication of the Forest conditions and references to the more interesting of the species which we do happen to have discovered.

Over the greater part of Wyre Forest extends, at present, a somewhat uniform growth of small oaks and scrub, which has been systematically thinned and cropped for pit poles and bark for tanning, and so never allowed to grow to any size. The soil seems rather poor and barren and there never seem to be many flowers or any richness of undergrowth among the trees. Of course many of the regular oak insects are there, and doubtless some species of Diptera among them, especially Tachinid and other parasites, but I cannot trace any special connection between any species of fly which we happen to have found, and the oak trees or insects associated with them. Indeed, on the whole, we have found the greater part of the woodland somewhat unprofitable to work and most of our collecting has been done in restricted areas of a somewhat different character; and in particular along the banks of the Dowles Brook, which runs through the Forest practically from east to west, cutting it into two roughly equal portions, the one being in Shropshire and the other in Worcestershire; the moisture

here produces a much richer flora than elsewhere and insects with it. From the Brook the ground slopes steeply on each side and high above the stream a railway runs roughly parallel with it, and here again there is a rather more varied flora along the railway banks and collecting is often good. Then here and there are small open meadows surrounded by Forest, and they too are profitable; one or two are to be found along the railway line; others adjoin the Dowles.

Much of our collecting has been done by watching certain attractive plants in flower, which have acted as baits for our quarry, willows, hawthorn, bramble, wild rose, euphorbia, etc., amongst them, and it is difficult to tell how far some of the visitors may have flown to get to them. Collecting of this kind has the disadvantage that one is unable to trace the origin of one's captures in most cases, and yet if one wandered far and wide to try and find the species really at home success would be very unlikely as diptera on the move are so difficult to follow with the eye.

The year's work has usually been commenced at Easter and we have paid a number of visits to the Forest at that time. The oak trees usually show no sign of Spring and there are not many signs amongst the lowly growth beneath the oaks so that the Forest in general still looks bleak and bare, but every here and there one can find about this date willows in flower, and a fine male willow crowded with bloom will keep one busy for hours; at least it will if the sun shines, but bright sunshine is indispensable so that it is only now and then that one gets a perfect day. When a fine day is secured the blossom will be crowded with insects of various orders, chiefly Hymenoptera and Diptera. Bombs, Andrenas, and Hive Bees will be mostly in evidence, but amongst them quite a lot of Diptera; some common *Muscidae* will be conspicuous but the bulk of the notable frequenters will be *Syrphidae*. *Melangyna quadrimaculata*, Verrall, unknown until Verrall described it in 1873 from British specimens, is always common here, and indeed I believe it to be generally common at willow-bloom in the spring, it certainly seems so wherever I have collected in the Birmingham neighbourhood. With it is *Syrphus lasiophthalmus*, Zett., another species regularly frequenting willow and apparently always common then. Mixed up with the Bees will be found Diptera which resemble them closely. The common *Eristalis tenax*, L., is of course present, and once when I wanted to capture a Hive Bee I found one of these flies in my box instead. The two fine *Cheilosia grossa*, Fall., and *C. albipila*, Mg., resemble the very numerous *Andrenas*, and have to be looked for very keenly if they are to be spotted. These two handsome species are regular Wyre Forest ones and can generally be obtained on the willows on suitably sunny days although they are always few and far between. Again amongst the Bombs has been taken, but much more rarely, the very fine insect *Criorrhina ranunculi*, Panz. On one perfect day, April 22nd, 1919, over by Buttonoak, at one willow situated deep amid the oaks, I took several and saw more, but this was the only occasion upon which more than an odd individual has been seen. It is a very evident mimic of Bombs of the *terrestris*, L., type. Perhaps it is scarcely a subject for wonder that at this season when the few insects on the wing seem congregated at these willow bushes, so many of the Diptera more or less resemble the bees amongst which they fly. It is however particularly noteworthy that, although there

is very little protective resemblance amongst the great family of the *Tachinidae*, yet one species flying at this time of the year and occurring on the willows, is the one British species, which bears some resemblance to Bees. This is *Servillia ursina*, Mg., a rare species, which may be regarded as one of the specialities of this locality. This species, a very large one, one of the largest of British flies, stout and robust, has developed a thickish, silky pubescence sufficiently long and conspicuous to give the insect some real resemblance to *Bombi* of the *agrorum*, F., group. On one occasion in March, 1894, during a spell of perfect Spring weather, Mr. Bradley and I found it for the first time in the Forest, and found it in conspicuous abundance. It was flying freely to the willows and there we took most of those we captured; but it was also in evidence wherever we went in the Forest, settling on posts, on palings, tree trunks and bushes, flying out into the sun and back again to the starting place like any other playful Muscid. Had we wanted them we might have taken hundreds and we easily took a good series each. Since that time we have never seen it in such numbers again nor indeed have I ever heard of its occurrence in abundance anywhere else; though on the same fine day referred to above, April 22nd, 1919, when I found *Criorrhina ranunculi*, Panz., I also found this species with it flying freely again, and probably it is only necessary to get a suitable spell of sunny spring weather to see it common once more. It is a matter for wonder what species of lepidoptera this insect parasitises; large specimens are so large that they must feed up in the bodies of some large larvae, but no host appears to be known yet.

(To be continued.)

The Asiatic origins of the Western Palaearctic Rhopalocera exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

(Continued from page 34.)

At the beginning of the Miocene, the average temperature began to fall again, and it diminished all through that epoch, whilst titanic land movements took place, considerably restricting the extent of the seas in Asia and establishing connections between the lands, which the flora and fauna availed themselves of to escape from the localities, which were becoming less suitable for them. The first isthmus to appear was the Hyrcanian one, between the Pamiro-Thibetan island and Anterior Asia. The comparatively small group of species, which had organised itself so as to stand hot and dry surroundings, was, as might have been expected, the first to flow through it and to spread rapidly into Africa, reaching the Canary Islands, before the Atlantic coast withdrew from them. It is remarkable how most of the species of those Islands are the same, and have retained the same features as in Asia; most exceptions of distinct species are afforded by the *Satyridae*, according to a general rule in this highly anabolic family, which rapidly moulds new species when it reaches new surroundings, because the mass of its species has very little power of adaptation by functional reaction. After this, there followed new flows of species, which were not as well prepared to meet the new surroundings, probably owing to their having lived in cooler mountain haunts; these had to acclimatise

themselves gradually, passing chiefly by the cooler and less arid route of Asia Minor and the Greco-Tunisian isthmus, and finishing in many cases by giving out a local satellite species or a very distinct exerge in Anterior Asia and in Morocco. Finally, at the very end of the Miocene, when the cold reached its climax, the high-mountain species moved too and constituted what may be called the "mouflon migration," as discussed by me in the paper on *M. aurinia*.

In the mean time other events were taking place: at about the same time as the Hyrcanian isthmus, another formed across the Ferghana-Kashgar channel, and the Thian-shan island joined on to the Pamiro-Thibetan one. From that day their plants and animals began to mix, producing a state of things, which Groum has pointed out particularly, consisting in many species appearing as though they were duplicated. In some regions the two forms breed absolutely true although they may inhabit localities not at all distant from each other, in other regions the two occur together as extreme individual variations of a single race: such is the case with *Parnassius discobolus* and *romanovi*, *Colias romanovi* and *erschoffi*, *Melitaea phoebe* and *sibina*. Lands emerge, as islands, all over the sea of Eastern Turkestan and blended into strips, running from east to west, and these new grounds induced vegetation, accompanied by animals, to avail themselves of these conditions, described by Wallace in his *Island Life*, and to spread rapidly, as they left their mountain and their northern refuges and substituted the tropical flora and fauna during the steady decrease of the temperature all through the Miocene. Apparently at that period migrations down the southern coast of Siberia, hampered by an abundant endemic population, by chains of mountains in the wrong direction and by the Dzungarian channel, were far less than those which passed around the Gobi sea by Manchuria, Pekin and the Kokonor region. Here, along the 40° lat., the climate must have been very similar to that of the Mediterranean and one is struck by the points of resemblance one finds, in many species, between the races of that latitude in Asia and those of Asia Minor and of the northern shores of the latter sea, as far as the south of France or Catalonia. It is obvious that the same exerge has pushed through the Ferghana straits, after they had dried up, and has then got around the eastern and the southern shores of the Aralo-Caspian into Asia Minor. In an article I have written for the *Annales Soc. Ent. de France*, I have shown in detail how the evolution of the *Anthocharis* and of the *Euchloë* can be reconstructed along these lines, in an admirable way.

As I have already mentioned, the facts one observes in *M. didyma* fit in perfectly with those I have outlined. Its remarkable exerge *didymoides*, Ev., of south-eastern Siberia as far as the Altai, according to Groum, is so very similar to *M. agar*, Obth., that one cannot doubt it is the original one of the species, but in the east of Asia one already finds *didyma* transformed in some characteristic aspects of our western exerges. Another striking exerge (*) is *ala*,

(*) Dr. P. Susehkin has shown in the *Zeitschr. für wissenschaftl. Insektenbiol.*, IX., Heft 6-7, p. 171 (1913), that the genitalia of *ala* are distinctly different from those of several races of *didyma* he has examined and he concludes it is a distinct species. My own impression is that it is only a very distinct exerge, but no definitive judgement can be given, except by observing whether transitional individuals exist where the two are found together. In the case of *M. phoebe* and *sibina*, mentioned above, Susehkin has found the genitalia to be exactly alike, so that one must discard for good and all the belief they are two species.

Stdgr., of the mountains of Central Asia, which points in the male sex to the pattern of *M. saxatilis*, Chr., of the same region, showing how the latter must have become transformed by local influences and finished by detaching from *didyma* as a local satellite species together with the still more extreme *M. acraeina*, Stdgr.; it is instructive to observe that the *saxatilis*, which have left Central Asia and gone to Persia, lack the characteristic obliterated pattern on both surfaces and exhibit to a very complete one, strongly recalling their ancestor *didymoides*. On the other hand in Central Asia even *M. phoebe* has acquired in its exerge *sibina*, Alph., the type of pattern of *saxatilis* and *ala*. They must all have originated in the islands and more probably in the Thian-shan one. Groun observes that *ala* is found in the Pamir with what he calls a typical *didyma* and in the Altai with *didymoides*; no doubt it spread there after the Ferghana, at the end of the Oligocene, and the Dzungarian, in the middle Pliocene, channels, respectively, had dried up. These facts are of the greatest importance, because they prove that, when once an exerge has been constituted under the effects of certain surroundings, its hereditary characters go on being reproduced after thousands of years, not only in other surroundings, but even when inter-breeding with other exerges has taken place on a broad scale; no doubt this is in accordance with the law of Mendel. As races of this sort cannot be classified under the heading of either of the two exerges, which have produced them, it will be convenient to call them SYNEXERGES and to place them in catalogues between the two latter. This will also have the advantage of distinguishing clearly these races, due to the convergence of two preexisting exerges, or different constitutions, from the equally variable races in which two extreme variations, or constitutions, tend to diverge and to separate into future exerges, by gradually eliminating one in some surroundings and the other under the opposite conditions of external influences. As a rule it is quite easy to decide if a race is due to convergence or to the beginning of divergence, because progressive variation occurs as a result of migrations along more or less definite and general lines and synexerges are met with when these lines meet. For instance, the north-east of Asia is the most important centre of divergence of Palaearctic species, whilst the area stretching from Central Spain to the Western Alps is the richest in synexerges, owing to the long chain of inland seas, which during several geological epochs have divided the Palaearctic region into two parallel strips, from the Pacific to the Atlantic, and into a third discontinuous one, between them, from Western China to Piedmont. The connections of the latter with the two others have been very variable during the various geological epochs. I have described those of its eastern end above and those of its western one in my paper on *M. aurinia*. To summarise the complicated events in its Caucasian portion, I have not yet dealt with, it will be sufficient to note here that at the end of the Oligocene it was fully connected with both the northern and the southern continent, so that the early Miocene migrations no doubt reached it from the latter side, including such species as *Z. cerisyi*, God. under its primitive form *caucasica*, Led. About the middle of the Miocene a channel formed on the north side and at the end of that epoch another on the south one, separating it from southern Armenia and turning it into an island. This accounts for

the fact that none of the strictly alpine species, which reached Anterior Asia with the "mouflon migration," are found in the Caucasus. The few which do exist, such as *P. callidice*, probably only got there during the Glacial epoch, by the isthmus which for some time rose between it and the Kopet-dagh, or at the end of the Glacial epoch, when the Caucasus again definitively became united to the northern and to the southern continent, just at the time in which such species would have been seeking refuge in the high mountains to escape the increasing heat. Amongst them was *Parnassius nordmanni*, now peculiar to that region, but presumably produced on a broader extent of the central zone by the transformation of the *P. clarus*, which invaded it during the Glacial epoch, after the connection between the northern zone and the central one was established in the middle Pliocene by the disappearance of the Dzungarian sea-arm. The evolution of this group of *Parnassius* is so clear that it is quite enlightening in understanding that of other genera. The genus, as a whole, we can presume to have originated during the Cretaceous in the coldest parts of the Polar continent, from the same source as the *Zerynthiinae* in the more temperate ones and as the *Aristolochia* Group of *Papilioninae*, which have rudimentary pouches, in the tropics of both the New and the Old World. The cold period of the end of the Cretaceous and the early Eocene caused the *Zerynthiinae*, the *Eurytus* and the *Euryades*, and perhaps the *Baronia*, to spread to an enormous extent, so that, when the return of tropical conditions substituted the *Aristolochia-Papilio* for them again, the colonies which survived in favourable mountainous regions were dispersed in the most distant countries of the World from each other. The Pamiro-Thibetan island is where most of them have been preserved and whence several passed on to the Mediterranean region, through the Hyrcanian isthmus, during the Miocene, including the genus *Lühdorfia*, now only found there as a fossil. The genus *Hypermnestria* shows how the *Parnassius* aspect and structure had been acquired to a certain extent even before undergoing a very cold climate. *P. eversmanni* is apparently one of the most ancient living species of *Parnassius*, still retaining the bright yellow colour of its tropical ancestors, and still existing in America and in Asia, near the arctic continent where it was produced. In America, returning southwards, it has turned into *clodius* and in Asia into the parallel species *clarus* and also into *felderi*. The latter has originated *citrinarius*, followed by *stubbendorfi*; *clarus* has evolved in exactly the same way, and, spreading around the south side of the Gobi Sea during the coldest period of the late Miocene, it must have reached the Pamir and turned there, or on its way, into *exerge gigantea*, Stdr., of *mnemosyne*, L., which could not be more identical with *clarus*, save for the constant lack of red pigment. If, as we suppose, the more recent flow of *clarus* ancestors of *nordmanni* passed through Central Asia rapidly, in spreading over a much broader zone, which they then found open westward and under favourable Glacial conditions of climate, it is natural they should not have got transformed to the degree of *mnemosyne*, but it will be noticed that the changes they have undergone, as compared with *clarus*, in the intensity and extent of the black and of the hyaline patterns and in size and shape, are exactly the same as those to be found in the race *caucasia*, Vrtý., of *mnemosyne*, as compared with *gigantea*. All this shows how fundamentally surroundings are

responsible for features we consider specific and, at the same time, how under their influence parallel lines of variation pass successively through the same grades.

Returning to *M. didyma exerge ala*, let us observe that to the south, in the Western Himalayas, and to the south-west, in the Caucasus, it is not found, even individually, in its characteristic form and it changes aspect entirely, but, notwithstanding, the races of those regions have retained prominently one of its principal features. Race *chitralensis* may belong to the southern *exerge*, but the aspect of its July and August generation makes me ascribe it to the *ala* one: a male collected by Saunders on July 8th in the Utzen nullah (Chitral), at 7-10,000 ft., and a female of the Shishi Kuh valley, at 9-14,000 ft., bear a surprising resemblance to the race of the warm marshes of the coast of Tuscany I have called *palustris* (see the description I will presently give), but they differ from it sharply by one feature, *i.e.*, the pre-marginal row of black spots is transformed into a continuous series of thin, but long arches, the points of which merge in the marginal band, as they are in the *trivia* which have this black pattern well developed and as they are in the most highly marked *ala*, but never in the other *exerges*; its origin from Central Asia is thus shown. I name this generation of *chitralensis*: **chitralipluvia**. The other races which exhibit the same feature markedly, are *transcaucasica*, Turati, from Nucha, and the one which is obviously its alpine race and I possess from the Latpari Pass, collected by the Sommer Botanical Expedition, on August 4th, 1890, at 2 to 3,000 m., in the European Caucasus, where it flew in company with *P. nordmanni*. It goes towards proving that the scanty alpine fauna of these mountains has reached them from the south and has come from Central Asia. Race *caucasica*, Stdgr. (the name is perfectly valid, because it was given to Herrich-Schäffer's fig. 588-90, in the 1861 edition of Staudinger's Catalogue, whereas *phoebe* race *caucasica* is the homonym, only described in 1871 and rightly renamed *ottonis* by Frühstorfer) is as different from the alpine race as possible and belongs to the large *turanica* and *subpatygosana* group. The much smaller alpine race, on the contrary, is, minus its peculiar premarginal features, nearly exactly like Herrich-Schäffer's fig. 267-8 ("type" of *alpina*, Stdgr.), in the female sex and so like a *trivia* on the upperside in the male sex that one might have had serious doubts as to the species it belonged to, if the central row of black streaks on the underside of the hindwings, did not prove it unmistakably. In 1922 when I named it *caucasi* in the *Ent. Rec.*, p. 13, I had not noticed this distinctive feature and I took it for a *trivia*, but that name must now be transformed to *didyma*.

(To be continued.)

Two Trips to Central and Southern Spain.

By P. HAIG-THOMAS, F.E.S.

(Continued from p. 31.)

Satyrus statilinus v. *allionia*.—Common at Granada, July 25th. Race *musaeus* (Frubst.).—A small form common at Albarracin.

S. actaea.—In the Sierra Alfacer this insect was very common, the central pale band on the underside of the hindwing is broader and more distinct than in the Provence race. Race *nevadensis*.—Not

uncommon from 5,500 feet-7,000 feet in the Sierra Nevada. In this race the central pale band on the hindwings is absent in the ♂, while in the only ♀ I have, the band is not nearly so white as in the Provence and Alfacar races.

S. artaea race *castiliana*.—The form at Albarracin. Common at Santa Croche and on the road to Losilla two distinct forms of the female occurred, one typical, the other like a small *cordula* ♀.

Pararge aegeria.—Very local in the Vega below Albarracin.

P. megera.—Very worn at La Granja and in Andalusia; race *viridior* common at Albarracin in June.

Epinephele pasiphaë.—Very abundant at Albarracin in mid June.

E. ida.—Fresh out at La Granja on July 10th. Females fresh at Granada on July 16th and a few females still fresh at Albarracin at the end of July.

E. tithonus.—Abundant everywhere in July.

E. lycaon.—Not out when I left Albarracin on June 19th. Common everywhere in July.

E. lupinus.—I took this insect in the Sierra Nevada and at Albarracin in July, but the males were already worn.

Coenonympha arcania race *clorinda*.—Near Noguera in the Sierra Alta this insect occurred rather uncommonly and it was very local. A fresh female was taken on June 13th and twelve males and two females on June 18th. At La Granja the insect was larger, but otherwise appeared to belong to the same race, the specimens were, however, mostly worn though much commoner than in the Sierra Alta.

C. iphioides.—Occurred at Albarracin locally, but not uncommonly in three of the valleys below Albarracin. First taken on June 8th. The last place was some three miles up the Val de Vecar. At La Granja, from where it was originally described, *iphioides* is larger. Here I found it common and widely distributed in July.

C. dorus.—First taken at Albarracin on June 16th. It was by far the commonest butterfly there in July. It was also very abundant at La Granja and in the Sierra Alfacar.

C. pamphilus.—A few were taken at Losilla rather worn on June 2nd. Not otherwise seen. I took one at La Granja. All were very small. The form *lyllus* was very common at Granada and in the Sierra Alfacar in July.

Limenitis rivularis (*camilla*).—Seen everywhere, but not common.

Pyrameis atalanta and *P. cardui*.—Seen everywhere, the latter often a nuisance when collecting other insects.

Vanessa io.—Seen everywhere, but only common at La Granja.

Aglais urticae.—Fresh out on May 31st below Albarracin; later it occurred everywhere.

Eugonia polychloros.—Very large and common at La Granja; elsewhere scarce.

Melitaea desfontainii.—Common below Albarracin; the females were scarce and usually worn. I took a fine aberration.

M. phoebe.—Common at Albarracin, approaching form *occitanica*, but not nearly so well marked as the *occitanica* from Andalusia.

M. pseudathalia.—Only at La Granja where they were mostly worn.

M. parthenie race *neradensis*.—I did not find this insect in the Sierra Nevada, but took a fresh ♀ near Bronchales in the Sierra Alta. It had been fairly common earlier.

Branthis daphne.—I took two fresh males at La Granja; not seen elsewhere.

Issoria lathonia.—By far the commonest Argynnid. I took a male with dark suffusion on the forewings.

Argynnis aglaia.—Everywhere, sometimes common, females still fresh on August 3rd on the Sierra Alta.

A. niobe.—The form *eris* common at La Granja but worn. Not so common in Andalusia. I did not see the typical form, which is said to occur in the Sierra Nevada.

A. cydippe (adippe).—The form *chlorodippe* was the only one I obtained in Spain and it occurred commonly everywhere in July, and females were still fresh on the Sierra Alta and at Losilla in August.

A. paphia.—The form *anargyra* was common and in good condition at La Granja.

Laeosopis roboris.—Common around the farm where the ash grows at La Granja, but many were worn on July 10th, though few of the bramble bushes were in flower. The insect was very conspicuous when settled on a sweet-scented yellow flower to which it apparently resorts before the bramble is out.

Strymon spini.—Sagara has given the name *bonilli* to the form from Albarracin where it was exceptionally common in the middle of June.

S. ilicis.—Abundant and fresh at La Granja.

S. aesculi.—Equally as common as *ilicis* at La Granja.

Ruralis quercus.—I took two specimens quite fresh at La Granja evidently just emerging. They were large, but typical. The race *iberica* was common but mostly worn on the evergreen oaks at the top of the hill behind the cemetery at Granada.

Heodes virgaureae.—The form *micgii* was common in all suitable localities at La Granja but very variable in the number of black dots on the upperside of the wings of the males. Some males have only the discoidal spot on the forewing, which is found occasionally in the Pyrenean form of *virgaureae* from Gavarnie.

Heodes alciphron.—The race *granadensis* was worn in the Sierra Alfacar. Common and some still fresh in the Sierra Nevada. The males are smaller than the Sierra Alta and La Granja *gordius* and have less purple dusting. I caught a female however larger than any female *gordius* I possess. The form *gordius* was common but worn at Sierra Alta, 5500 ft., on June 18th. A fresh pair in the Val de Vecar on June 19th were all I saw at Albarracin. It was common but worn on July 9th at La Granja, and fresh at 5700 ft. on the Pico de Peñalara on July 14th.

Rumicia phlaeas.—With the summer form *eleus* common everywhere.

Lampides boeticus.—Widely distributed and often common everywhere.

Tarucus telicanus.—Widely distributed. It was commoner in the garden of the Hotel Sierra Nevada at 3500 ft. than anywhere else.

Cupido minima.—I took a number of rather worn Lycaenids in the Sierra Alta early in June and sent some to Capt. Riley who informs me that they are *minima*. The males have no blue dusting and are the same colour as the females. They flew with *Polymmatius semiarqus* and the females were usually on *Vicia hirsuta*. I searched the ground again on August 2nd, but saw no sign of it. The insect here apparently does not fly over such a long period as in the Alps. The flight also

was more rapid than that of the *minima* I have taken before. I believe *minima* is very scarce in Spain, though there is a specimen labelled from "Sierra Nevada" at S. Kensington. I suggest the name **nogueræ** for this race.

Plebeius argus (*ægon*).—The subspecies *hypochiona* was common in June in the Val de Vecar at Albarracin. I saw a few worn specimens at La Granja in July, and also in the Sierra Alfacar. I took a few fresh specimens on the Loma de San Geronimo in the Sierra Nevada in damp places at about 5500 ft. From here to the top the form was replaced by var. *vacaresa*. This form was common and fresh in both sexes almost all over the upper part of the Loma de San Geronimo. Though much like typical *ægon*, on the upperside of the wings this insect is much more like *P. argyrognomon* on the underneath side. At the same time it is peculiar to find such distinct forms as *hypochiona* and *vacaresa*, if both are forms of *ægon*, almost together on the same slope.

Plebeius zephyrus subsp. *hesperica*.—I took a male below Santa Croche on May 31st. Afterwards I found the insect in five different localities below Albarracin. In one only was it really common and I found this only when the insect was already worn. A fair series however was obtained.

Scolitantides baton.—I saw only two or three fresh specimens at Albarracin in June, the insect being practically over before my arrival.

S. orion.—Locally common at Albarracin.

Plebeius medon (*astrarche*) subsp. *calida*.—The spring generation at Albarracin was scarce; in late July it was fairly common. The species was abundant at La Granja and Granada and in the Sierra Alfacar, also a few up to 4000 ft. in the Sierra Nevada. From 6000 ft. to the top of Loma de San Geronimo the form *montana* was occasionally met with. This form is larger than any other form of *medon* that I have taken. The red submarginal spots on the upperside of the wings are much reduced and the upper ones on the forewings are obsolete, while the white marginal band is very prominent. The flight of this form is entirely different from that of *calida*, being much more rapid.

Plebeius idas.—This was one of the insects which I was most anxious to obtain, and I spent much time fruitlessly searching for it—and climbed on an average at least 4500 feet on five successive days before I found it. I eventually found a locality, which was not more than 40 yds. long by 20 yds. wide, at 6700 feet where it flew. The insect flies so close to the ground (never more than three or four inches off it) that it is very difficult to catch. Even when settled if the net is placed over it it has no desire to rise up and owing to the rough surface of the ground often escapes underneath. In three days I took 25 specimens, ten of which were too worn to keep and were released; of the others twelve were in fine condition. I took one specimen about a quarter of a mile north-west of this locality and on identical but lower ground. No doubt if I had been a fortnight earlier I should have done better. I gather that the insect is more abundant on the high ground near Lanjaron, on the south side of the Sierra Nevada.

Polyommatus icarus.—Was far from being the commonest Lycaenine. The females at Albarracin were very fine.

P. thersites.—Rather worn and not very common in the sainfoin fields in June. I did not find the second generation.

P. amandus.—Not uncommon locally above Noguera in the Sierra Alta and beautifully fresh on June 13th and 18th. It apparently does not differ from the Swiss race.

P. hylas.—I took a fresh male on July 22nd on the Loma de San Geronimo at just over 6000 ft. Ribbe took one specimen and Rambur also found it in the Sierra Nevada. The var. *nivescens* was widely distributed at Albarracin. A male was first seen below Santa Croche on June 4th and a female on June 12th. I took two fresh males and one fresh female on July 30th on the same ground. It was flying in the Sierra Alta at 5000 ft. on June 13th. In the Sierra Alfacar I saw a few worn specimens in mid July.

P. escheri.—Was not uncommon in the upper part of the Val de Vecar at Albarracin. First taken on June 8th.

Polyommatus thetis (*bellargus*).—Common at Albarracin from June 1st and a few of the second generation were observed from July 28th. Also the second generation in the Sierra Alfacar.

P. arragonensis.—Very abundant at Santa Croche and near Losilla at Albarracin at the end of July. The *albicans* form was abundant in the Sierra Alfacar; both sexes were well out on July 17th.

P. coelestissima.—I took this beautiful Lycaenid plentifully in a new and somewhat restricted locality above the Royola Cantanero, a few kilometres below Moscadon about three hours fast walking from Albarracin, I obtained all I wanted of both sexes in a short time and I also took one *hispana* flying on this ground.

P. admetus. And the form *ripartii*.—Were common in all localities around Albarracin at the end of July, rather worn, on the low ground.

P. damon.—A small race was locally common three miles up the Val de Vecar and at Losilla at the end of July.

Iolana iolas.—I was very pleased to have found this insect not uncommon high up the Val de Vecar. The females of this race have the blue suffusion spread over most of the upperside of the wings, and stretching along the costa of the forewings. It is probably worthy of a name.

Cupido sebrus.—Very abundant at Albarracin all through June.

Polyommatus semiargus.—Common and fresh, flying with *C. minima* on the Sierra Alta in June; not otherwise seen.

P. cyllarus.—The form *blachieri* was common at Albarracin in June.

Lycaenesthes argiolus.—One or two in the Vega below Albarracin and near the Sierra Nevada Hotel.

I hope at a later date to submit a list of the *Hesperiidae* captured after I have shown them to Mr. Warren.

Description of a new Genus and new Species of Noctuidae. Subfamily Ophiderinae.

(Continued from p. 25.)

By A. E. WILEMAN, F.E.S., and R. J. WEST.

Bematha transversata sp.n.

MALE.—*Palpus*: pinkish-buff. *Antenna*: ciliated. *Head*: frons and vertex pinkish-buff. *Thorax*: patagium and tegula pinkish-buff. *Abdomen*: pinkish-buff above and beneath, light-buff laterally. *Pectus*: light-buff. *Legs*: pinkish-buff, tarsi tinged with fuscous. *Forewing*:

pinkish-buff, medially, a fine faintly marked, slightly incurved wood-brown line; a wood-brown spot on discocellulars; postmedially, a small patch of wood-brown suffusion between veins 4 and 6, and a suffusion of wood-brown at apex. *Hindwing*: pinkish-buff suffused with warm-buff basally. *Underside*: fore- and hindwings light-buff, a wood-brown spot on discocellulars of hindwing.

Expanse 38mm. (*tip to tip* 37mm.)

HOLOTYPE. *Male*.—Kolambagan, subprov. Lanao, Mindanao I. Philippine Is. (plains) 24.V.1914.

NEAREST ALLY.—*B. extensa*, Wlk. (India, Singapore, Borneo).

Hyposemansis mediopallens sp.n.

MALE.—*Palpus*: cartridge-buff, with two fuscous bars on second segment, and one on third segment. *Antenna*: bifasciculate. *Head*: frons cartridge-buff, vertex cartridge-buff mixed with fuscous. *Thorax*: patagium fuscous, bordered outwardly with cartridge-buff, tegula fuscous. *Abdomen*: cartridge-buff tinged with fuscous, fuscous-black at base dorsally, venter cartridge-buff, anal tuft warm-buff. *Pectus*: cartridge-buff. *Legs*: cartridge-buff tinged outwardly with fuscous, tarsal segments fuscous, cartridge-buff at joints. *Forewing*: basal half cartridge-buff suffused with wood-brown; a fuscous spot at base, sub-basal fascia fuscous, wavy, broken; antemedial fascia fuscous, wavy, slightly oblique outwardly; on costa from antemedial to postmedial fasciae, a flap of hair-scales, overlaying wing to near subcosta; at distal end of this flap, beyond cell, an elongate tuft of raised scales; medially, two wavy fuscous lines from lower angle of cell to inner margin; the distal half of wing cartridge-buff, a suffusion of wood-brown below costa, a fuscous streak near apex, termen fuscous, crenulate, fringe wood-brown. *Hindwing*: cartridge-buff, two fuscous streaks from base to antemedial fascia, one on median nervure, the other on anal vein; antemedial fascia, consisting of two wavy, fuscous lines; area beyond suffused with wood-brown, subterminal fascia, a wavy, fuscous band, defined distally by cartridge-buff and wood-brown; a band of fuscous terminally. *Underside*: *forewing*: cartridge-buff with a fuscous point on costa medially; postmedial fascia wood-brown, from vein 6 to inner margin, a fuscous spot between veins 6 and 7 subterminally; lower half of subterminal area suffused with wood-brown; *hindwing*: cartridge-buff at base, antemedial fascia, consisting of two wavy lines, the upper half fuscous, the lower half fuscous-black; area beyond suffused with wood-brown, in which is a wavy, fuscous-black postmedial fascia.

Expanse 36mm (*tip to tip* 35mm.).

HOLOTYPE. *Male*.—Klondyke, subprov. Benguet, Luzon I. Philippine Is. 800 ft. 10.IV.1912.

NEAREST ALLY.—*H. lasiophora*, Hmpsn. (Borneo.)

Pangrapta plumbilineata sp.n.

MALE.—*Palpus*: light-buff inwardly, mixed with fuscous outwardly. *Antenna*: bifasciculate. *Head*: frons and vertex light-buff, mixed with fuscous. *Thorax*: patagium and tegula light-buff, mixed with fuscous. *Abdomen*: fuscous, venter light-buff. *Pectus*: light-buff. *Legs*: light-buff speckled with fuscous, tarsal segments

fuscous, light-buff at joints. *Forewing*: light-buff tinged with fuscous; sub-basal fascia fuscous, excurved to median nervure; antemedial fascia fuscous, in three excurves to inner margin; medially, a fuscous shade, outwardly oblique from costa to reniform, which is faintly marked, then inwardly oblique to vein 2, wavy to inner margin; post-medial fascia fuscous, defined by cartridge-buff distally, outwardly oblique from costa to vein 6, excurved and incurved to anal vein, inwardly oblique to inner margin; beyond postmedial, a light-buff patch and three cartridge-buff points on costa; subterminal fascia, a broken, fuscous, wavy line; termen fuscous, straight to vein 4, angled and oblique to tornus. *Hindwing*: light-buff tinged with fuscous, antemedial fascia; a fuscous lunule on discocellulars, with a spot on each angle of the cell; postmedial fascia, a fuscous-black line, slightly waved, followed by a fuscous-black shade; subterminally, two fuscous-black spots, the larger one between veins 5 and 6, the smaller one between veins 2 and 3; subterminal fascia, a broken, fuscous, wavy line; termen fuscous, straight to vein 3, angled and oblique to tornus. *Underside*: fore- and hindwings warm-buff, markings similar to upper-side.

Expanse 26mm. (*tip to tip* 25mm.).

FEMALE.—Similar to male, antenna ciliated, with paired setae.

Expanse 28mm (*tip to tip* 26mm.).

HOLOTYPE. *Male*.—Kanshirei, Formosa, 1000 ft., 18.VIII.1905.

ALLOTYPE. *Female*.—" " " " 20.VIII.1905.

NEAREST ALLY.—*P. aviusalis*, Wlk. (Singapore, Borneo).

Pangrapta yoshinensis sp.n.

MALE.—*Palpus*: pale-drab-grey tinged with fuscous. *Antenna*: serrateciliate, with paired setae. *Head*: frons and vertex pale-drab-grey tinged with fuscous. *Thorax*: patagium and tegula pale-drab-grey tinged with fuscous. *Abdomen*: pale-drab-grey tinged with fuscous above and beneath. *Pectus*: pale-drab-grey. *Legs*: pale-drab-grey tinged with fuscous. *Forewing*: pale-drab-grey tinged with fuscous: sub-basal fascia fuscous, excurved; antemedial fascia fuscous, wavy; orbicular indicated by a fuscous spot, reniform outlined with fuscous, a short longitudinal fuscous streak toward base, from the bottom of the proximal edge; postmedial fascia fuscous, defined distally by pale-drab-grey, obliquely incurved to vein 6, serrate and excurved to vein 2, incurved to anal vein, incurved to inner margin; subterminal fascia fuscous, defined distally by pale-drab-grey, wavy, broken; termen fuscous, excised to vein 4, angled and obliquely excised to tornus. *Hindwing*:—pale-drab-grey tinged with fuscous; post-medial and subterminal fasciae fuscous, defined distally by pale-drab-grey, parallel, outwardly angled at vein 3; termen fuscous, angled at vein 3. *Underside*: forewing pale-drab-grey tinged with fuscous, post-medial fascia fuscous; hindwing pale-drab-grey, fuscous spot on discocellulars, postmedial and subterminal fasciae fuscous.

Expanse 22mm. (*tip to tip* 21mm.).

FEMALE.—Similar to male, antenna minutely ciliated.

Expanse 24mm. (*tip to tip* 22mm.).

HOLOTYPE.	Male.—	Yoshino,	prov.	Yamato,	Honshû	1.	Japan
22.VII.1900.							
ALLOTYPE.	Female.—	„	„	„	„	„	„
20.VII.1900.							
4 PARATYPES.	Males.—	„	„	„	„	„	„
on 19, 22, 23, 24.							
VII.1900.							

CURRENT NOTES AND SHORT NOTICES.

The *Annual Report of the Smithsonian Institution* contains only one paper concerning insects, viz., "The Mind of an Insect" by R. E. Snodgrass. The treatise is in four sections (1) The Sensory Basis of the Mind. (2) The Reactions of Insects to Environmental Stimuli, (3) Instinct of Insects and (4) Intelligence of Insects. The first section deals with the mechanism and facts of sensation and it is stated "We can conclude that consciousness is potential at least in all living matter, that it may be feebly developed even in the lowest animals, but that it has become functional in the more highly organised members of several groups." The second section is a very interesting one full of illustrations of the reactions due to Gravity, to Light, to Heat, to Humidity, to Smell and to Taste, to Sound, to Currents (air, water), to Pressure, etc. Section three on Instinct gives the results of controlled experiments with the normal habits of insects particularly as to mating and oviposition. Reactions to stimuli after mutilation are dealt with in detail. The fourth section touches on memory and the discrimination of sensory impressions. "Experiments on dragon-fly larvae show that these aquatic creatures can be trained to come to food offered them and that they learn to overcome their fear of strange surroundings."

The second volume of the *Bulletin of the Hill Museum* is now complete, and consists of VIII+340 pages with 18 plates 2 being coloured. It is largely a record of new species and new local races and subspecies obtained by those collecting for Mr. J. J. Joicey in various parts of the tropical world. The study is not confined to the Rhopalocera, but deals largely with *Noctuidæ* and *Geometridæ*, described by Miss A. E. Prout, and Mr. L. B. Prout respectively. The Lepidoptera collected by Messrs. T. le Cerf and G. Talbot in the Great Atlas, Morocco in 1927 are recorded and commented on, and of the Microlepidoptera, 2 genera and 12 species are reported by E. Meyrick as new to science, out of the 47 species submitted to him. As a special supplement, Arthur Hall who is well known as a keen student of the *Nymphalidæ*, is publishing a "Revision of the genus *Phyciodes*" with plates of new species and forms. It should form a reliable standard work on this large group of the smaller Nymphalids of Central and S. America. We must congratulate the Museum staff on the continuous stream of work put out and also on the excellent get up of the *Bulletin*.

We must draw the attention of readers to the new regulations which we understand are now in force, affecting entrance to the inclosures of the New Forest, for collecting, etc., purposes. The restrictions now imposed are the result of the frequency with which fires occurred during 1926 and 1927, which were traced to other than

natural causes. Over 70 fires occurred in the New Forest during 1927, and 14 of these were actually in inclosures. It is now absolutely forbidden :—(a) to smoke, or strike any match, or in any other way to produce fire ; (b) to carry any lamp or light, other than an electric torch, or lamp ; (c) to use any oil or spirit stove or fire for picnic or other purposes in any of the inclosures of the New Forest. A permit to enter such inclosures is now necessary, and which must be produced on request by a forester, etc. Infringements of the above regulations involves cancelment of the permit, perhaps for good.

REVIEWS AND NOTICES OF BOOKS.

BULLETIN OF THE ROYAL BULGARIAN NATURAL HISTORY INSTITUTIONS. —For all the reproach of rusticity that used to be levelled against them by their neighbours the Bulgarians have done better and more solid work in various branches of Natural History than all their neighbours put together. It may be urged that the impulse to study came from without ; that it was Tsar Ferdinand, whose political miscalculations cannot obscure the great services he rendered to the intellectual life of Bulgaria, was the principal if not “ the only begetter ” of the activities of Bulgarian botanists and naturalists. But the seed required fruitful soil. Bulgarian naturalists have shown that the national qualities of patience and perseverance joined to an instinctive taste for the study of nature will go far. The work done by Stefanoff, Yordanoff and Tosheff among the botanists and by many naturalists of whom Dr. Iwan Buresch, A. Drenowski and Drenski, are entomologists well known on the Continent—has been remarkably thorough, and in spite of a multitude of handicaps and difficulties they have acquired *inter alia*, a knowledge of the Entomological Fauna of their own country, which is astonishing to those who remember that when Mrs. Nicholl and the late Colonel Elwes visited Bulgaria, it was a *terra incognita* to western entomologists.

The Bulgarian entomologists—and other Bulgarian scientists—owe much to the encouragement and aid of His Majesty Tsar Boris, who is himself an excellent all-round naturalist and a botanist of exceptional powers. The scientific institutions, which are his property and are for the most part maintained from his small civil list, include the Royal Natural History Museum, the Royal Zoological and Botanical Gardens, the Royal Entomological Station, and the Royal Scientific Library. The Entomological Station is quite unrivalled in the Balkans ; its series of Bulgarian Lepidoptera, Coleoptera, and Hymenoptera are excellently arranged and the data are generally full.

At the same time the linguistic difficulty has prevented the results of much valuable research from becoming fully known abroad. Tsar Boris has now met this difficulty by founding the Scientific Bulletin under review. His objects are the publication of original scientific work dealing with the collections in the Royal Museums and Institutions, and with the Fauna and Flora of Bulgaria, the translation of all important Bulgarian papers on the above subjects, and the publication of a complete bibliography of publications, dealing with the natural history of Bulgaria and of all references thereto. All papers written in Bulgarian in the Bulletin will be summarized in French or

German and Bulgarian descriptions will be fully translated. Dr. Iwan Buresch will edit the Bulletin.

The first number of the Bulletin, which is before the reviewer, contains several entomological articles of interest. M. E. Handschin of Basle writes on the "Cave-dwelling Collembola of Bulgaria" and describes three new species. A long paper by Dr. Buresch and Mme. Kantarjieva (summary in German) deals with the Bulgarian *Carabinae* (Coleoptera) as does a paper by Dr. S. Breuning of Vienna. Dr. Redikorzev of Petersburg (he does not write Leningrad) contributes an article with 12 excellent figures on the Pseudoscorpions (*Chernetidae*) of Bulgaria and describes several new species of these Arachnids. Ichthyologists will find two full descriptions in German of two new *Cobitidae* from Dr. Buresch's pen and the Ornithologist will appreciate a most interesting account of the breeding in captivity in the Royal Zoological Gardens at Sofia of the Lämmergeier (*Gypaetus barbatus*).—P. P. GRAVES (F.E.S.).



BITUARY.

O. R. Goodman, F.Z.S., F.E.S.

In the death of Mr. O. R. Goodman the South London Entomological Society has lost one of its great helpers, who had been on the Council several years, and was at the time of his death on January 5th, Vice-president elect. He was born at St. Ives, Cornwall, and from early childhood had a love for nature; from the age of 12, to the present time, he had kept a diary of natural history observations. In later years he had devoted much time and energy in the study of the Palaearctic Rhopalocera of which he had a very fine collection. Accompanied by his son, who was equally keen with himself, he spent his annual holiday in many parts of the continent particularly the Southern Alps and the Riviera. On several occasions he organised trips to include some of his fellow members of the S. London Society—those who went well remember the pleasant time that was spent. Recently he had gone as far as N. Africa, and on that trip obtained material that was much wanted by Warren to complete his Monograph of the Palaearctic *Hesperiidae*. He lost no opportunity of adding new members to the Society and was ever ready to give advice and information to the younger men. The last three years he had seriously taken in hand the organisation of the Annual Exhibition, and as a result the arrangements were on somewhat different lines which have tended to make the gatherings more popular and more successful than ever before. For some years he had suffered from an internal complaint heroically borne; even only a few months before his death, after a serious operation, he spent a holiday in southern France among the haunts of his beloved butterflies. When the Exhibition was held in October last he had himself brought from his sick room to spend an hour among his friends in the circles he took delight in. After passing through the workshops he was articulated as an Architect and Surveyor. Recently he had been on the Council of the Incorporated Association of Architects and Surveyors. For over thirty years he had held the responsible position of Agent to St. Bartholomew's Hospital Estates. He was 53 years of age and a Fellow of both the Entomological and Zoological Societies.—Hy. J. T.

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to Hy. J. TURNER, "Latemar," West Drive, Cheam.

We must earnestly request our correspondents NOT to send us communications identical with those they are sending to other magazines.

Reprints of articles may be obtained by authors at very reasonable cost if ordered at the time of sending in MS.

Articles that require ILLUSTRATIONS are inserted on condition that the Author defrays the cost of the illustrations.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. Hy. J. TURNER, "Latemar," West Drive, Cheam.

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.

Duplicates.—Fine bred *prunaria* grossulariata varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—British Noctuae and forms.

Desiderata.—Pupae: *opima*, *populeti*, *incerta*, *gracilis*, *capsophila*, and many others.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

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Galls.—In view of the forthcoming Monograph on British Zoo—and Phytococcidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

Wanted loan of series of *E. jurtina* (unusual aberrations not required) from East Anglia, N. and S. Wales, Northern England, Scotland (E. and W. sides), and Connaught, for study of geographical variation.—P. P. Graves, F.E.S., 5, Hereford Square, London, S.W.7.

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CHANGE OF ADDRESS.—K. J. Hayward from La Forestal Ltda., Villa Ana, F.C.S.F.C. to the English Club, 25 de Mayo 586, Buenos Aires, Argentine.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 20th. April 3rd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. March 28th. April 11th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2. first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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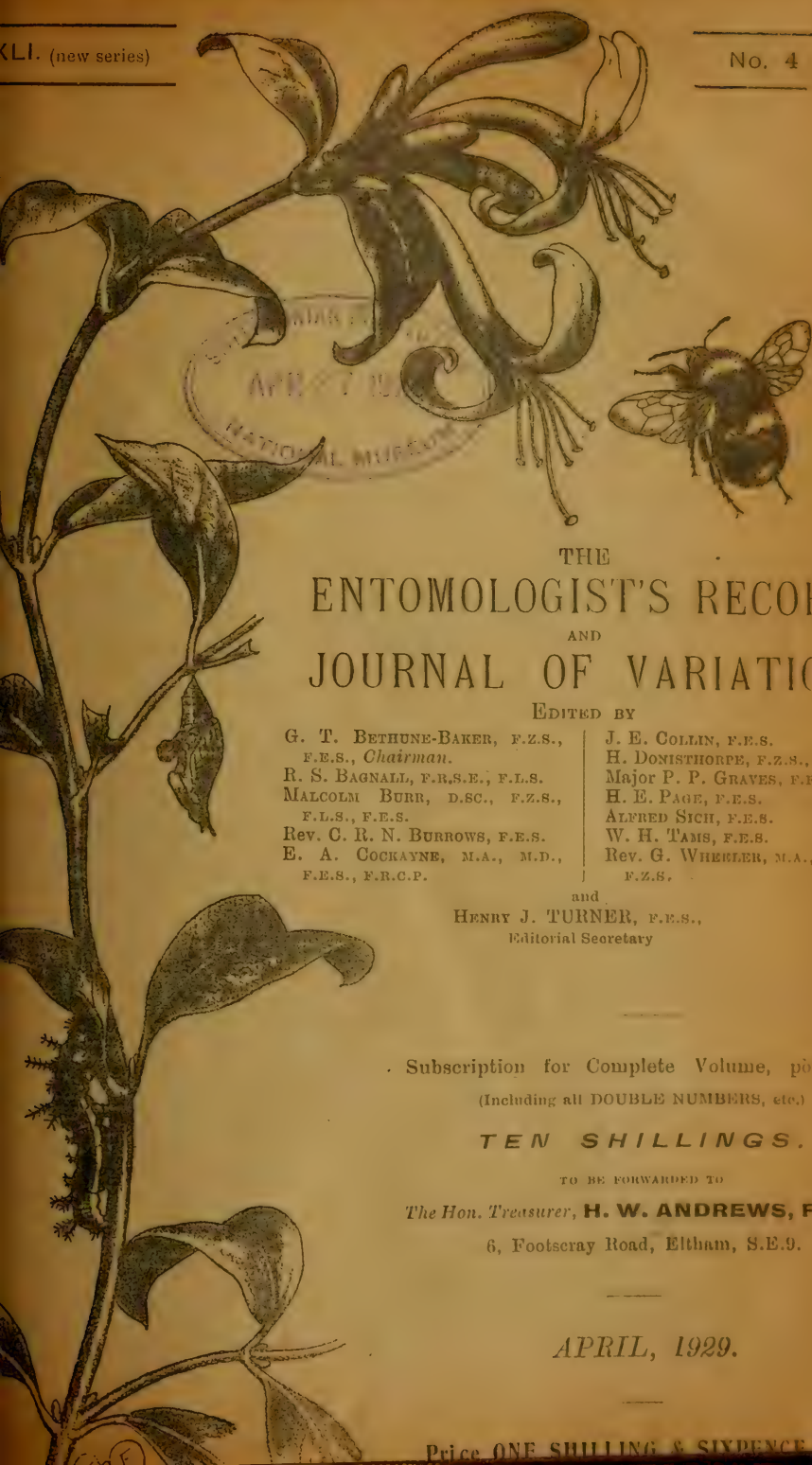
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Observations on "Guests of British Ants." Chapter XIII. Spiders.

By A. RANDELL JACKSON.

In his book *The Guests of British Ants* Mr. Donisthorpe devotes Chapter XIII. to spiders. These he arranges in three groups:—

"I. Those species always found with ants. They belong to the Synoeketes or indifferently treated lodgers."

"II. Those species which hunt and prey on ants. They are generally found outside and in the neighbourhood of the nests."

"III. Those species which closely resemble ants in appearance. They hunt their prey in the neighbourhood of the ants's nests and are protected from outside enemies by their resemblance to ants." All these he calls "myrmecophilous" spiders.

No "true guests" or Symphiles are known amongst spiders.

Mr. Donisthorpe gives a very good account of the Synoeketes, of which we have only four species. Of two of these he was himself the discoverer as far as Britain was concerned. There is no doubt at all that *Evansia merens*, Camb., *Thyreosthenius biocatus*, Camb., and *Acartauchenius scurrilis*, Camb., are regular lodgers in the nests of ants and only very occasionally found at large, having presumably strayed more or less temporarily from their abodes, or possibly being in the act of changing lodgings. The case of *Tetrilus arietinus*, Thor., is more complicated. It exists in two forms, which Mr. Pickard-Cambridge called *Cryphoea diversa* and *C. recisa*. The former has small widely spaced eyes, and the latter, which is almost certainly *Tuberta arietina*, Thor., var. *macrophthalmia*, Kulez., has much larger ones, much more closely grouped. I have examined a great deal of material and there seems no other constant difference between them. Mr. Donisthorpe has found a considerable number of both forms in the nests of various species of ants. On the other hand both forms may occur at large away from such hosts. *C. diversa* occurred at Carlisle and in Glamorgan away from ants. I took a large number of *C. recisa* in 1912 under the bark of old trees in Sherwood Forest, likewise away from ants. Over large areas of the forest this was an abundant spider, almost every loose-barked tree having its denizens, but in June the majority were not adult. In these districts it would be difficult for the ant *A. fuliginosus* to make a nest in a tree not occupied by this species.

It is a tempting notion to consider *recisa* with the large eyes as a free living form, and *diversa* as a form, the eyes of which have become reduced since it took to living in the dark recesses of ants' nests, but the light of our present knowledge hardly warrants this view.

The two other groups contain a number of species the connection of which with ants is much more obscure. The several species in Group II. have all been found in the nests of ants. Most of them are quite common elsewhere. *Harpactes hombergii*, Scop., for example, is common in most houses and porches. *Phrurolithus festinus*, C.L.K., is frequent in almost all situations. Nothing is known of the habits of *Centromerus subacutus*, Camb., of which only two specimens have been taken, both males. One of these was a male Mr. Donisthorpe took in 1906. The rest of these specimens he sent to Mr. Cambridge at that time turning out to be another species.

The type male has now been lost and Mr. Donisthorpe's is the only one in existence. This may turn out to be a true myrmecophile, in which case it would have to be removed to Group I.

In Group III. there are several extremely ant-like species. *Myrmarachne formicaria*, De Geer, *Synageles renator*, Lucas, and the *Micarias* are all very much like ants.

The first is a very rare spider with imperfectly known habits, but the others occur quite freely in places far removed from ants. *Synageles renator* lives inside the dry and blackened stalks of marram grass on sandhills for which habitat its long linear shape well fits it. There it lays its eggs and there it is born.

The extremely ant-like appearance of these genera, *Harpactes*, *Micaria*, *Phrurolithus*, *Myrmarachne*, *Synageles* and others, is supposed to protect them from their enemies, the chief of which are Hymenopterous. The effect of this resemblance would be lost if the spiders actually lived with the ants, as in that case they would not be exposed to the eyes of their enemies. We find then as we should expect that the Synoeketes which live always—or nearly always—with the ants are not ant-like, whilst the so-called ant mimics lead a free existence, outside, but frequently in the neighbourhood of the nests.

Of *Diblemma donisthorpei*, Camb., nothing is known except that it is not a member of our fauna but an importation from elsewhere.

Mr. Donisthorpe's book is of extraordinary interest, and an enormous amount of field and experimental work as well as literary research has gone to build the solid foundation of knowledge on which it is based.

Midsummer in Spain 1928.

By COMMANDER WYNDHAM FORBES, R.N., F.E.S.

(Concluded from page 11.)

June 25th of 1928 found me still at Albarracin. I saw my first *Melanargia iapygia* at Losilla on the 27th, a little later they were common there on the track below the forest. On July 3rd I drove to Noguerra with Herr Carl Predota; we went towards Bronchales and up the hill to the right of the Puerto di Bronchales. *Coenonympha arcania* and *Melitaea parthenie* were common, as also *Parnassius apollo* and some other butterflies. I took three specimens of the yellow-spotted *apollo*, and some fine females with well developed red spots in the forewings. When resting on the top of the mountain a *Melanargia syllius* flew into my net, which I believe to be the fourth taken in the the Albarracin district. Later in the day I picked up a specimen of *Melitaea trivialis*, but did not find any more. *Brenthis hecate* and *Polyommatus amanda* were also flying. *Cistus laurifolium* was in blossom. The *P. apollo* on the Sierra Alta are earlier than lower down. On July 5th at Losilla I saw only two, though on the 3rd there were already many worn specimens. *Satyrus priouri* was first seen on the 5th by Herr Predota, near Santa Croche; on the 6th many males were flying there, and I also took a fine female of the form *uhagonis*. *Strymon aesculi*, *Satyrus actaea*, *S. circe*, *Nytha alcyone*, and *Polyommatus admetus* abounded. I also took in the Vega a specimen of *Polygonia egea*, which I do not think to have been reported before in this district.

On July 8th I left Albarracin intent on *Erebia palarica* at Pajares, between Leon and Asturias. I had only vague ideas as to the accommodation available there, and people I asked at Leon and in the train gave conflicting opinions, as the result of which I found myself at the station at 7 p.m., on the 10th, with our luggage on the platform and no road, not even a mule track, by which to remove it. Some distance below lay the village of Pajares and the military road over the pass. However the station master presently provided two stalwart mountaineers, and shouldering some of the luggage ourselves we scrambled down a footpath to the road, where we were able to hire a mule to carry the gear five kilometres to the hotel, which is at the top of the pass halfway between Busdongo and Pajares. We ought to have alighted at the former station where a trap could have been hired. This hotel has not been built many years; it commands a fine view of chasms and crags towards the Pico di Europa, to the N.W., and is much frequented by weekend parties from Leon, though not very full during the rest of the week. There is also a smaller and cheaper inn at the Puerto and another in the village of Arbas a kilometre further south.

I was out bright and early next morning, and walked along a track to the westward, through high *Erica vagans* in its three forms, and patches of *Menziesia* and crimson foxgloves, but found very few insects. *Melitaea aurinia* v. *beckeri*, *Brenthis selene*, *Coenonympha pamphilus*, *Pararge maera*, and *P. apollo* occurred and when I got to the road again near Arbas, *Erebia stygus* in some numbers. To the east of Arbas is a great glen with some small unworked coal mines in it, and here, along the brook at its bottom, I found *E. palarica* on the 13th fairly common, with *M. parthenie*, *M. pseudathalia*, *B. selene*, *M. aurinia*, *Argynnis aglaia* and one *Heodes virgaureae*. On subsequent days I also met with a female *Erebia erias*, *Brenthis euphrosyne*, *Cupido sebrus*, and some others. *E. palarica* is found right up the glen and on the rough heathy hill sides, but it is not so easy to catch on the hill sides as it is at the bottom. On the 16th I struggled up to the lowest patch of snow on the hill, and saw on a scree a couple of large *Erebia*, but was unable to catch them, so do not know whether, as is most probable, they were *palarica* or another. Except along the stream I was struck by the comparative scarcity of butterflies generally: hay fields, which in the alps would have been swarming with insects, would hardly shew any. Perhaps later in the year they are more numerous.

I left on July 17th by Oviedo, Santander, Bilbao and Hendaya. It was quite remarkable how the season advanced as the train got further east. At Oviedo, the hay was not yet cut, while near La Hendaye the wheat harvest was already well advanced. I was also struck by the absence of trees in the mountains near Pajares. The natives said they would not grow on account of the wind and snow, but I don't believe it. The country appears to be eminently suitable for afforestation. At present it is waste, only grazed by a few cattle.

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

XIII. THE LUNGUE BUNGU.

After a series of mild adventures, I have arrived on the banks of the Lungue Bungu, an important tributary of the Zambesi, a bigger river than those we have so far visited and richer in game, which is an advantage from the catering point of view. The country is green and fresh and young and tender foliage covers the trees of the scattered and scrappy forest that is in and around the valley.

The day we left the Simoi, or Simoj, or Mu-simoi as it is variously rendered, a feeder of the Lungue Bungu, my porters brought me a Pseudophyllid, the first of this interesting family that I have seen alive; it is of a very delicate green and the elytra are fragile as paper; unlike most Locustids, except the bulky and flightless *Ephippigeridae* and *Hetrodidae*, it chirps with rage when handled, and makes serious attempts to bite; from its appearance I expect it is arboreal in habit and look forward to finding it myself.

After much hunting under the bark of dead trees, I have at last come across a living adult *Apachyns depressus*, P.-B., that strange earwig, flat as paper, which has been noted by Westwood and other older writers as a specially remarkable insect; hitherto I had seen nymphs only, and few of them; this specimen had evidently only quite recently emerged from the nymphal skin, for it was pale, and in fact the elytra and wings were white. It was very nimble and I could only get it out of the recesses of the old timber by burning the log and smoking it out; unfortunately, owing to an accident on the road, this interesting specimen has been spoilt. I have ripped the bark off hundreds of dead logs and found *Apachyns* only in three and the equally characteristic genus *Echinosoma* only once; it may be a mere coincidence, but all these were in trees that were still standing; in trunks and logs on the ground I have found none. They are so active that I expect they feed on the termites that swarm in the dead timber. They are not, however, confined to trees, as I have found them wandering in tents and in chop-boxes, like common earwigs, perhaps in migration to a fresh tree.

In an earlier letter I have referred to the deeply coloured membrane of the neck in the *Pamphagidae*; this is a very interesting and problematical phenomenon; I have not noticed it or heard of it in another group, unless *Tmethis* is referable to the *Eremobiidae*, a point which years have allowed me to forget, but in any case, they are all desert-loving insects. I have just had two fine males brought to me of the genus *Xiphicera*, or some closely allied genus; they are of a dull, reddish-brown, to match the sand on which they occur, and the only bit of brighter colour is the richer red of the thigh-linings. I stretched forward the heads to see the neck membrane and found, as noticed in specimens from the Munhango, that the membrane is of a dirty, greenish white, but on each side there is a small black velvety patch with a central spot of purplish blue; in this case this blue spot is double; when examined under a lens it is visible that the blue spot is a sort of membrane stretched drum-wise, and triangular in form. The conclusion is irresistible, that these are an organ of some sort. At first I thought they might be auditory organs, but the *Pamphagidae*,

as other Acridians, have their ears on the first abdominal segment, at the sides; it is an interesting point and would be well worth research, anatomically in the cabinet, and by observation in the field. I doubt whether much can be seen in dried specimens, and the whole feature was unknown till Porchinsky, who knew the genus *Nocarodes* in the field in Caucasus, called attention to it in a special paper, an abstract of which was published in the *Entomologist's Record* by Professor Poulton nearly thirty years ago. When in Macedonia, Captain Campbell and I watched the numerous *Tmethis* carefully, but never saw it expose this coloured spot, except incidentally when it stretched its head forward to feed; the only suggestion that I know of is that it is used as a signal, like a flag to its mates. This is the suggestion of Captain Campbell, who was much interested. Possibly they are scent organs. Unfortunately, specimens occur but sparingly here and I have little chance of observing them. In dried specimens the head remains in its normal position, retracted tightly up against the fore edge of the pronotum, which covers the posterior portion of the head capsule.

The *Pamphagidae* are in every way an interesting group; they are desert-dwellers, and generally of a uniform coloration to match their surroundings, usually greyish or brownish, but I have taken quite black ones, though larvae only, on ground blackened by bush fires.

The organ is present in other Acridians, but not in so prominent a manner; in an *Ornithacris*, which I looked at when fresh, the neck membrane is much shorter and tighter and pale whitish in colour, with no bright spots, but there are two little slits in the membrane at the back of the head capsule on each side; they are very small and obscure and would be hard to observe in dried specimens; even in a fresh one, under a strong lens they can only with care be distinguished from the creases in the soft membrane. The membrane is shorter and the head less extensible in the *Acridiidae* I have examined than in the *Pamphagidae*, and the organ much smaller and less prominent, apart from its absence of coloration. The neck membrane is veined and has the appearance of being sensitive.

Besides the neck membrane there is a second membrane connecting the pronotum with the body at the posterior margin; this is visible only when the edge of the pronotum is lifted and, of course, is shrivelled and hidden in cabinet specimens. But in life it is visible under certain conditions. I have noticed that the pretty little grasshopper *Acrotylus* has a trick, when captured and held in the hand, of inflating this membrane so that it protrudes behind the edge of the pronotum and has the appearance of a bubble, usually cushion-shaped; under the lens it is seen to be veined and the upper surface is ornamented with little round excrescences and a fluid may be seen underneath. The intention is probably to frighten its enemies, and doubtless it is startling enough to a small creature. The grasshoppers of this genus frequent the hottest, dustiest, driest places and are clearly members of the desert fauna. Two species are common in trees common in the south of Europe, and as they hibernate and appear in the warm days of the early year and are common enough by March, they are familiar to many visitors to the Riviera; they assimilate closely to the dry ground on which they occur, but the brilliant flash of their scarlet wings, with black band, reveal them for a moment when they fly. They are nimble

creatures, and usually kept just out of range, and as they sit on flat open ground, they are difficult to catch with the net. They are probably of Ethiopian origin and there are a good many species in Africa.

Here in Angola I find one kind in paths through the forest which are often in the shade; these are dark in colour, the belly is marbled with black and the wings are scarlet. But on the dusty roads in the open, I find a much paler form, closely matching the mottled sand, with yellow belly and orange wings. Now the membrane of the latter is yellow and pale, while that of the darker is a deep orange. The species of *Acrotylus* shade off almost insensibly and I cannot help feeling that these are two forms of one and the same species, the pale form, adapted to its lighter surroundings, being a sort of albinistic variant; the failure of the pigmentation, or whatever be the explanation of the paleness, affecting the whole body so that the hidden membrane is deep orange in the darker form and pale yellow in the lighter one.

I do not know what are the natural enemies of these pretty little creatures, but judging from their haunts, I should say lizards.

A boy has just brought me one of those amazing Empusid Mantids which are scarcely distinguishable as insects, so closely and in such detail do they resemble a dried leaf. The process of the vertex is produced into a long lobe with undulated edges and widened at the tip; it is veined like a broken bit of leaf and has little spaces like those transparent holes in the pronotum and elytra of certain *Eumastacidae* to which Brunner von Wattenwyl applied the term hypertelic. The middle and posterior femora and tibiae also have similar lobes or processes, so that they have just the appearance of the stem of a leaf, or midrib, with little bits of the leaf adherent. The elytra and much of the wings are transparent, with a pearly lustre, but darkened to a deep reddish brown at the tips; the elytra are more or less rounded at the tips, but the wings, which are longer than the elytra, are rather angular, so that in repose the tips of the wings, protruding beyond those of the elytra, give a quadrangular outline.

Accustomed though one be to the marvellous adaptation of the Orthoptera to their surroundings, such specimens as these, just like the "burnt grasshoppers" referred to previously, fill one with amazement. There is no other word. I cannot help feeling that natural selection is not sufficient to produce such perfection; it seems to me that equal protection would be afforded by a much feebler approximation, and that there is some other influence at work which we do not yet understand. It seems almost like a photographic action and these Orthoptera are like extremely sensitive plates. When one sees those "burnt" grasshoppers, no two alike, in their natural surroundings, and the shading and tints of the sand-hunting species like *Chrotogonus*, and above all this exaggeration of perfection in these leaf-mantids, and in such creatures as the famous leaf-Phasmids of the Ceylonese genus *Phyllium*, one feels, or perhaps I should say that I feel, that Brunner's word "hypertely" is a useful one, without any acceptance of his demand for the intervention of an artistic appreciation of a creator in his handiwork.

The resemblance of the Locustids to their surroundings is very marked; the green arboreal species do resemble leaves, but these lack

those astonishing finishing touches, in which one sees, as it were, the hand of the true artist rejoicing in his skill, which occur in some *Eumastacidae* as *Choroetypus* and the allied genera, in some of these "burnt" grasshoppers which look exactly as though the individual specimens have been singed and scorched, and again in very many Phasmids and Mantids. It is especially in the latter that I have been struck, in the mauve *Harpax* nymph swaying on its spidery legs like a pea-flower in the breeze, or the motionless black and white ones that are indistinguishable from the lichen on which they sit, and yet are, I believe, of one and the same species, and now in these leaflike Empusids.

Another Orthopteron, that arouses my curiosity, is *Phymateus morbillosus*. It is a big Pyrgomorphid, well known in all collections, and illustrated in the British Museum series of postcards. The only ones that I have seen, even in the dry season, have been green ones, though it is the buff form that is illustrated in the postcards. They are big, bright green fellows, with little red knobs on the pronotum; the elytra are speckled light green and yellow. There is something so outstanding in the coloration, and the yellow and green so prominent that one at first feels that the coloration must be aposematic. But when you see them on the green in the sunlight, you realise that if they are aposematic, then the spots of the leopard are aposematic too. Just as a leopard disappears against the twinkling shade of the forest, so this mottled green and yellow harmonises with their surroundings; the green represents the foliage and the yellow represents the sunlight.

But when they fly, they expose the gorgeous wings; these are indigo blue in the anterior portion, orange red in the axillary area, mottled all over, with the green and yellow pattern on the elytra appearing at the tips. This may be aposematic, but I hope soon to see one in full flight. I strongly suspect that the coloration will help it to disappear, just as the splendid plumage of the bee-eater is lost in the brilliant sunlight. I have noted in an earlier letter how a related form with bright green elytra and orange wings and yellow rings to the antennae completely merges with its surroundings when it flies and settles on the small-leaved trees which look like *Mimosa*.

A dingy Orthoderid Mantid has been brought me, which exactly resembles a piece of dark bark; the excrescences on the pronotum recall the little irregularities of the surface and the chinks are represented by the slight spaces between the limbs and the body; the whole creature is flattened. It is interesting to note that the only area where there is any colour relief, such as the Orthoptera in general seem to delight in, is on the belly, which is marbled with orange, and the jaws. The under surface of the prosternum and fore limbs is black, so that those parts would not be visible when it raises its head in the characteristic praying attitude to seize its prey. As it is a flattened creature, the fore limbs lie naturally in the same plane, and it is particularly interesting to note that the curvature of the pronotum is exactly fitted by that of the anterior margin of the fore femora, so that when these are drawn close to the pronotum, they fit tightly. I have already noted the same thing in *Pyrgomantis*, but that is a member of the Savannah Fauna, is a grass-lover, and so cylindrical, and the lateral edges of the pronotum are in a vertical plane, and the

fore femora, when tucked up, are folded underneath the pronotum, the femora being also in a vertical plane, the two curved edges corresponding exactly, the convexities of the one fitting into the concavities of the other.

It seems to me that one might almost say of the Orthoptera that in general they love bright colours, but when it is dangerous for them to wear them and they are obliged to assimilate to some dingy background, their love of finery finds expression in surfaces which are not normally exposed, though perhaps they may be deliberately shewn. This is most striking, of course, in the *Oedipodidae* and other grasshoppers, the grey or blackish surface of which is relieved by the brilliant coloration of the wings when in flight. It has been suggested that this has a definite object, to attract enemies, as birds or lizards, to the bright colour, which disappears directly they settle; the disappointed pursuer then wastes his time by continuing to look for the bright flash. When *Acrida* flies it makes a clattering noise and for the moment, being big, noisy, and often gorgeous, is a very prominent creature, but directly it settles and closes its wings, the elongate form assimilates with the grass which it frequents.

Apterous species have their colours on the belly, and expose this, sometimes at least, by turning a somersault when they leap and so to a certain extent achieve the same result; I have noticed this with the white-bellied *Tmethis* of Macedonia, which exhibit a great range of variation on the upper surface, always adapting themselves to their surroundings, but flashing their white belly when they leap; in the scrub here there is a ponderous little Acridian which, though winged, is but a clumsy performer, and seems to prefer to leap, and then exposes its yellow belly in the same way.

The Pamphagids, whether the fully winged or the apterous ones, all assimilate very closely to their surroundings and are generally grey or brownish, but they have a bright lining to their posterior femora. Many Mantids have a highly decorative pattern on the under face of the anterior coxae or femora, but it has been suggested that this is to mimic flowers; I have noticed it more particularly on green forms, as *Mantis*, *Sphodromantis*, etc., which chiefly frequent shrubs.

Small grasshoppers, while often assuming a green, brownish, or blackish coloration of head, thorax and elytra, seem to have red abdomens, which are covered by the elytra when at rest, but exposed when flying; perhaps this is analogous with the brilliant wings of the *Oedipodidae*.

Another curious feature in the coloration of the Orthoptera is seen where the brilliant colour of the inner face of the posterior femora is partly transferred to the contiguous flanks of the belly; it looks almost as though the leg had been put on before the paint was dry, so to speak, and some has come off on the opposite side.

The red of the wings of some *Acrida* appears in the same way to be transferred to the contiguous surface of the abdomen, but the tip of the abdomen is bright red or pink even in pale species with yellow wings.

The brilliant yellow of the wings of some *Pygomorphidae* undoubtedly represents sunlight.

There are three forms of *Acrida* here; at one time I thought they were forms of one species, but now I am coming to the conclusion that

they may be distinct; they occur in similar localities, in hot, dry grassy places, and often enough together. One is mottled and variegated in pattern, either green or buff prevailing, with plain yellowish wings; this seems identical with a form which is common in the south of Europe. Another is plain, green or buff, and had bright yellow wings with a strong black fascia; the third is invariably of a plain reddish tint and the wings are crimson. It is a beautiful creature and very prominent on the wing, especially as the members of this genus make a clattering noise when they fly.

Butterflies have not made the same obvious progress with the advance of spring as the Orthoptera. In the dry country one does not see many, but in the neighbourhood of water they occur in flocks. On the banks of the Lungue Bungu there is a boggy patch where they swarm, and at one spot the ground was literally covered by a solid phalanx of butterflies. The most striking is a beautiful *Papilio*, light blue banded with black, with prominent tails; a white one with similar pattern seems to be the female; with it there are quantities of a light brown Satyrid that recalls the Wall, a small and rather dingy Lycaenid and number of a bright yellow Pierid, with the forewings tipped with brown; these are yellow above and beneath and there are two sizes of them, perhaps sexes. To form an idea of the numbers settled at that spot, I made a side stroke with a butterfly net and found in it thirty-nine butterflies; of these seven were the blue *Papilio*, eight the white form which I suspect to be the female, three of the Satyrid, six of the Lycaenids and fifteen of the yellow Pierid. I have no doubt that the record could be beaten, but when taken in this way they make poor specimens, as they damage themselves so much by fluttering in the net before they can all be dealt with.

It is not only the butterflies and Orthoptera that are brilliant here, for gorgeous colours are sometimes exhibited by the lizards. Yesterday I saw a brilliant spot of turquoise on a tree; it moved, and I saw that it was a greenish lizard, probably *Agama*, the body of which was of the same colour as the tree, but the head of a brilliant and dazzling blue. Pavel Stepanovich tells me that the intensity of colour in this genus is an expression of the emotions, and he has seen, in Central Asia, what he took for a gorgeous flower on a Saxaul shrub, which carries no flowers; his curiosity aroused, he dismounted and went to examine it; as he approached, it faded away and he found a dull-looking greenish-grey lizard.

Coccinella hieroglyphica, L. Notes and New Aberrations.

By G. CURTIS LEMAN, F.E.S.

The following appear to be unnamed and unrecorded aberrations. I have followed the numbering of the spots given by Edwards in his interesting monograph on this species in *Ent. Mag.* L. 139.

1. ab. **marshami**, n.a. mihi.— $\frac{1}{2}$, 1. (Weybourne, Norfolk, 1923, Leman.)
2. ab. **weybournensis**, n.a. mihi.— $\frac{1}{2}$, 3. (Weybourne, Leman.)
3. ab. **donisthorpei**, n.a. mihi.— $\frac{1}{2}$, 1, 5. (Windsor Forest, 1928, Donis.)

4. ab. **sempunctata**, n.a. mihi.—1, 3, 5. (Weybourne, Leman.)
This is the only specimen I know without the $\frac{1}{2}$ spot.
5. ab. **interrupta**, n.a. mihi.— $\frac{1}{2}$, 1 (broken into long spot and small spot at base), 3, 5. Type in Mr. Philip Harwood's collection. (Newbury, 1909.)
6. ab. **edwardsi**, n.a. mihi.— $\frac{1}{2}$, 1+3+5. (New Forest, 1923, and Windsor Forest, Donis.; Weybourne, Leman.)
7. ab. **lloydi**, n.a. mihi.— $\frac{1}{2}$, 1+3, 2, 5. (New Forest, Donis.)
I have taken the liberty of naming this after Mr. C. Lloyd, chief of the Crown Estates Office, Windsor, in recollection of a very pleasant day spent in the Forest with Mr. Donisthorpe under his auspices.
8. ab. **ellisi**, n.a. mihi.— $\frac{1}{2}$, 1, 3, 4, 5. (Weybourne, Leman.)
9. ab. **kirkae**, n.a. mihi.— $\frac{1}{2}$, 1+3, 4, 5. (New Forest, Donis.)
10. ab. **conjuncta**, n.a. mihi.— $\frac{1}{2}$, 1+3+2, 5. (Weybourne, Leman.)
11. ab. **sigardi**, n.a. mihi.— $\frac{1}{2}$, 1+3, 2, 4, 5. (New Forest, Donis.)
12. ab. **harwoodi**, n.a. mihi.— $\frac{1}{2}$, 1+3+2, 4, 5. Type in Mr. Philip Harwood's collection. (Newbury, 1909, and Weybourne, Leman.)
13. ab. **maderi**, n.a. mihi.— $\frac{1}{2}$, 1+3+5, 2, 4. (Weybourne, Leman.)

The types of Nos. 1 to 4, 6 to 11 and 13 are in Mr. Donisthorpe's collection. In the same collection are three abnormal specimens with different formulae on each elytron. (a) R. $\frac{1}{2}$, 1+3, 5; L. $\frac{1}{2}$, 1, 3, 5. (b) R. $\frac{1}{2}$, 1, 3, 5; L. $\frac{1}{2}$, 1, 5 (Donis.), and (c) R. $\frac{1}{2}$, 1+3, 4, 5; L. $\frac{1}{2}$, 1+3, 2, 4, 5 (Leman), all taken in Windsor Forest (1928). Mr. Philip Harwood has two specimens taken at Newbury. (d) R. $\frac{1}{2}$, 1, 3, 5; L. $\frac{1}{2}$, 1, 3 (in both cases spots 3 and 5 are very minute) and (e) R. (1+3+ $\frac{1}{2}$) (3+5); L. 1+3+ $\frac{1}{2}$, 5.

It may be observed that though Edwards describes his ab. *5-punctata* as having spot 1 reduced to a point, this name will also embrace specimens with formula $\frac{1}{2}$, 1, 3, where the spot 1 is the normal shape and size. This reduction occurs in other aberrations, viz., ab. *sempunctata*, Rye, Mr. Donisthorpe having taken 2 specimens in Windsor Forest and New Forest with spot 3 and spots 3 and 5 (Windsor Forest) respectively reduced to points.

It may be well to record captures of other known aberrations by Mr. Donisthorpe and others: ab. *brunnea*, Ws. (Windsor Forest, Donis.), ab. *5-punctata*, Edwards (Newbury, Harwood), ab. *sempunctata*, Rye (=ab. *robini*, Pic.) at Oxshott, 1902, and Windsor Forest, Donis.; Weybourne, Leman; Newbury, Harwood, 1909. ab. *sinuosa*, Marsh (=ab. *4-fasciata*, Ws.; ab. *bracchiata*, Grادل.) in Windsor Forest, Donis., and Newbury, Harwood. ab. *flexuosa*, F., (Braemar, 1910, and Windsor Forest, Donis.; Weybourne, Leman). ab. *schneideri*, Grادل., Newbury, Harwood, a very finely marked specimen with formula: (1+3+ $\frac{1}{2}$) (2+1), 4+5.

I do not agree with Edwards' synonymy of ab. *sempunctata*, Rye, for ab. *lineolata*, Marsh.

The latter's description is:—"puncto communi scutellari et in singulo lineola longitudinali nigra ad basin, puncto unico in medio et altero minus postice."

Rye's description is:—"Var. B. (*sempunctata*) Elytra same colour as the ordinary form, with six distinct spots, three on each

elytron and one on each scutellum." He adds that this variety is generally common. I read his formula to be: $\frac{1}{2}$, 1, 3, 5, which is in fact a common variety, and ab. *lineolata*, Marsh, as $\frac{1}{2}$, 1, 2, 3 (a variety I have never met). Both Della Beffa (*Rev. Cocc. It.* 1913, Tav. V. fig. 42) and Kuhnt (*Kaf. Deutsch.* 1913) give similar figures and formulae.

I hope in a later paper to deal with the aberrations in which the black pigment predominates.

My thanks are due to Mr. Donisthorpe, Mr. Philip Harwood and Herr Leopold Mader for help in preparing this paper, and both the former for lending me their specimens.

The Asiatic origins of the Western Palaearctic Rhopalocera exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

(Continued from page 43.)

To classify the races of the West in a rational way it is only necessary to realise that they fall into three natural groups, corresponding to the three zones described above and probably also differentiated constitutionally into three exerges, as I have remarked at the beginning of this paper.

The northern, nominotypical, exerge is obviously a direct emanation of the original *didymoides* one, after it had spread westward from the Altai region; it resembles the male of the latter in size, shape, fringe, tone of colour and pattern, but the sexual dimorphism is greatly reduced, owing to the female having made an approach to the male aspect, particularly in the lowland races. One of its deviations from the uniform aspect it usually has, compared with the other exerges, is afforded by race *neera*, F.d.W., as restricted to the original meaning, that is to say, to the race of the warmer localities of southern Russia. The colour of the male, its fringe and the shape of the wings of both sexes seem to me to be indicative of its origin from the northern exerge, although, having spread southward, the latter has evidently intercrossed with some races of the following one.

The Central exerge one should, I suppose, designate as *dalmatino-caucasica*, Stdgr., from the two oldest valid names to be included in it and fortunately very suitable, because they refer to two extreme characteristic forms amongst the large number of very different ones this exerge has produced, even though we exclude from them the alpine races of Central and Western Asia, which we believe to have originated from another stock, as discussed above. From races of very large size, like *graeca*, *patycosana*, *turanica*, *caucasica*, *subpatycosana*, *eutitania*, *mauretanica* (all with broad quadrate wings), it passes to minute forms of the II. generation, like *aravatica*, *dalmatina*, *marsilia*, *calbalaria*, and *occasus*. The fulvous is never of as warm and saturated a tone as in the preceding exerge: the male is always of a clearer fulvous, more mixed with yellow and brighter, when it is not quite ochreous, and the female of most races is often of a yellowish white.

As belonging to a third, Southern, exerge *casta*, Koll. (= *perseae*, auctorum, nec Koll.)—*occidentalis*, Stdgr. should, to my mind, be considered the races which inhabit the parched regions of the extreme south and

which to all appearances have developed a constitution suitable to these peculiar surroundings, because they exhibit features never seen, even as extreme individual variations, in the races of the Central exerge, although some of them live in very similar conditions, and because, on the contrary, the latter in such cases dwindle to a degree of minuteness and paleness which *casta* and *deserticola*, Obth., never are reduced to. I think there is little doubt that *occidentalis*, Stmgr. and *castiliana*, Malc. of Morocco and of the Iberic Peninsula as far north as Aragon, are races of larger size and fuller markings of the same Southern exerge, where it has met with richer food and more favourable conditions generally. It will be noticed it constantly has longer and more pointed wings than in any race of the Central exerge, exactly similar to some Chinese ones, and that it retains a tendency to develop the central row of spots and to reduce the marginal ones in the same individual, which is precisely the most prominent feature of *deserticola* and which exists to a certain degree in Seitz's figure of his *pekinensis*. Another fundamental fact to observe is that the summer emergence does not produce the smallest and weakest forms one finds in the Central exerge, although it lives in the best surroundings to be turned into such forms. It stands to reason, we should maintain, that this exerge has been evolved with that lot of species and exerges, which acquired the same sort of constitution during the Eocene and the Oligocene and which were amongst the first to migrate across North Africa at the beginning of the Miocene. Some of them afford clear evidence that they have been derived from a Chinese descent and presumably begun to transform in the Pamiro-Thibetan island: *rulcania* from *indica*; *feisthameli* from *podalirinus*; *cleobule* and its further grade *cleopatra* from *amintha*; *cheiranthi* from *nepalensis*; etc. We are thus justified in assuming that this third exerge of *didyma* evolved independently along the Southern route, whilst the second one was evolving along the Central route. In Persia these two stocks have met again in the same region, but, in accordance with a very general rule, one can see in many species, such as the very instructive *E. ausonia*, with its race *verityi*, Riley, of the Central exerge, including *venosa*, Btl., and its race *persica*, Vrtz., of the Southern exerge, including *daphalis*, Moore, as well as with its twin species *creusa*, Dbldy., *orientalis*, Brem., exerge *pulverata*, Chr. These exerges pass through that Hyrcanian region keeping true to their breed, and then separate again along the Northern and Southern Mediterranean routes, evidently selecting the one which is most suitable to their respective constitutions, as developed in Asia. It would be very interesting to see whether also in Persia they keep distinct because they select different kinds of haunts and they do not, in consequence, fly together.

THE NORTHERN EXERGE DIDYMA, ESP.—I have again examined the question of the author of this species and, now I possess a copy of Esper's original edition of the XVIII. century and a considerable amount of materials from Central Europe, I must fully confirm the statements I made in the *Ent. Rec.* of 1919, p. 179. I am, in fact, still more surprised at the way all writers have overlooked the original description, Vol. I., p. 365, and figure, pl. XLI., fig. 3, of a female from Uffenheim in Franconia. When I had only the less accurate colouring of Charpentier's later edition of Esper to judge from and very

few specimens from Central Germany, I had taken that figure to represent a female of the second generation, but I have since realised that it represents quite a frequent form of that region, where there apparently is only one generation. I have series of examples also from Bohemia and from Lower Austria and a few even from Mähren, in Styria, which all belong to that same nominotypical race *didyma*, Esp. Its features are the following: small size; long, narrow wings; pointed at apex; long fringes and hairs; colours of a deep, saturated tone; fulvous of male very reddish; that of female more ochreous, but of a distinctly warm tone and very even over the whole of the wings, so that this sex is very constantly of the andromorphic form; basal suffusion in both sexes broad and of a deep black colour; black markings well developed and all more or less equally on both surfaces; ground-colour of underside, as a rule, of a cold white, but, now and then, of a warm yellow; fulvous bands of this surface of a deep red tone (in Esper's figure they are yellow, but this, like the two little black circles with a central dot of the forewings, which have given rise to the specific name, are due to the fact that the specimen was unfortunately aberrant in this respect). Lang's figures of *didyma* in his *Butt. Eur.* and Berge's in his *Schmetterlingsbuch* represent this race fairly well, but Kirby's reproduction of the latter in his *English Butt. and Moths of Eur.* lack red; Seitz's would be good, save for the shape, which is too short and broad.

As to the specimen from France which Esper figures on pl. LXL, fig. 1, and which I have (*l.c.*) named *RUBIDA*, taking it to be the first generation of the preceding, I now see this was not correct and that it belongs to a distinctly different race, which is the first degree of variation due to interbreeding with the Central exerge. I have specimens from Thiaucourt, in the N.E. of France, which agree with it perfectly and the race of Berlin I have called *subrubida* is, more or less, the same one, so that the latter name is only of use to designate the individuals which approach the southern races most. Race *rubida* is larger than the nominotypical one, described above, the wings are broader and more rounded, the fulvous is always reddish, but more mixed with yellow and clearer on both surfaces, the black markings are, on an average, lesser in extent, including the reduced basal suffusion of upperside and the streaks on underside of hindwings, and the white of the undersides is usually of a slightly yellowish hue. I will presently describe these forms as compared with southern *protea*, in dealing with the II. generation they produce in the southwest of France.

The remarkable *NIGRORUBIDA*, Vrtý., stands good as a race in Saxony, being a large *rubida* with very heavy black spotting.

Passing to examine the races of the Alpine region, one can only confirm Frühstorfer's remark that the way the name of *alpina*, Stdgr., has been applied to them all, indiscriminately, is simply absurd, considering the number of extremely different ones which exist there. I must go further and show that this name cannot be used for any of them. It was published for the first time in the I. edition of Staudinger's *Catalog*, of 1861, as follows: "v. ♀ (♂ ?) *Alpina*; fascelis var. H.S. 267 (? 268)." The locality is only suggested by the meaning of the name, Staudinger evidently having observed that females with a grey suffusion over the forewing chiefly came from the Alps, but unfor-

fortunately the figure quoted represents a female from Constantinople, as Herrich Schäffer informs us at p. 163, presumably of a race similar to the very melanic *CRASNENSIS* one, described by Hormuzaki from Krasna, in Moldavia. The fact that Staudinger only quotes the upperside and that he discards the underside figure of the same specimen makes it clear he only intended to consider one character and that his name should only be used, as he intended it to be, for females, with the upperside suffused with grey, whatever race they may occur in. In the II. ed., of 1871, he points out the feature he had in mind by the following diagnosis: "*♀ al. ant. viresc., post. rufis,*" repeating the quotation of Herrich Schäffer and giving "*Alp.*" as locality, but this, of course, has no more value, because of the figure he had fixed as "type" since 1861. As a matter of fact some of the females of the race I have collected at Bormio, m. 1200, in the Rhaetic Alps, resemble Herrich Schäffer's figure to a degree which is really surprising in races of two such different sorts of localities. I feel sure, however, that, if I had before me a series of both sexes from Constantinople, their average aspect would be anything but similar and I do not hesitate to record the Bormio race under the name of **rectealpina**. It is the race of the Alps which stands nearest to the nominotypical one of Central Europe by its small size, the elongated and pointed shape of its wings and their rich, deep, colours; the males, in fact, are absolutely identical with it; the females, instead, have a very different look, because most of them belong to the *alpina*, Stdgr., form and the few (25%), that do not belong to it, have, nevertheless, the very whitish ground colour of the forewings of the latter, whilst only 8% are of the warm uniform fulvous of those of Central Europe.

From the Val di Fraele, above Bormio, at 2000m., I have specimens of a culminating alpine aspect: the male only differs from that of *rectealpina* by being of a deeper and very dull tone; the female is entirely suffused with a uniform veil of light grey, through which the black spots appear greyish too and a few whitish spaces show dimly; all the fulvous is abolished except a very faint trace on the forepart of the hindwing: race **superalpina**.

Next to *rectealpina* comes the race I have described (*l.c.*) from the Cottian Alps (co-types from Falcimagna, m. 1200, above Bussoleno; this is in the Susa Valley, but much higher than Susa I mention in the original description) under the name of *SUBALPINA*. It differs from it in the male sex by the slightly less saturated tone of fulvous and by the lesser extent of the black basal patch and of the pattern generally; the females are strikingly different and much less attractive on account of their discoloured and dirty look, due to the fact that the black is of a greyish tone and that the suffusion of it spreads more over the ground-colour and shades off into it, diminishing the contrast between the markings and the latter, but due more particularly to the faded tone of the fulvous, which is nearly equal on fore- and hindwing, whereas in *rectealpina* the forewing is usually of a clear white and the fore-part of the hindwing is of a rich, bright, reddish fulvous, producing a very pleasing effect. Out of 18 females collected at Oulx at 1100m. in the same Susa Valley, 2 have no trace of grey suffusion, 4 have the forewings entirely veiled by it, 1 has also the hindwing with the same aspect. Also the underside of this race is much more dull and dirty than in *rectealpina*, and the black spotting much thinner.

At Clavières, at 1700m., I have met with a remarkably minute race, with a very broad and deep black basal patch and with the females nearly entirely shaded over with black, so that in the more extreme melanic ones the spotting is quite inconspicuous; the males average 30mm. between the apexes, against the 32 to 35 of Oulx, and the females 30 to 35 against 35 to 38: race *PARVALPINA*, Vrtý., *Ent. Rec.* 1928, p. 163.

The races described above, except *rubida*, constitute a compact Group, which I think one can safely consider the direct descendant of the late Pleistocene migration by the northern Siberio-Russian route. It occupied the regions which the Miocene migrations by the southern Hyrcanian route had not reached, owing to the climate and to the barriers of the Danube morasses and of the Alps. The difference in the constitutions of the exerges of this species are, however, not sharp enough, as I have already noted above, for them to fight each other and exclude each other completely, in the way one sees very distinctly in other species, so that the Northern exerge was able to push on as far as the West and the South of France. This is not surprising, because most Lepidoptera have evidently done the same, as far as the southwest of France is concerned, and its races resemble much more the races of Central Europe than those of Italy and of the southeast of France. In a few cases even Catalonia has been reached, and no proof of this could be more evident than the presence at Barcelona of *Apatura ilia*, Schiff., in its white form (race *barcina*, Vrtý.). In the case of *didyma*, also in some localities of the southeast of France, which seem, however, always to be the less arid ones in the hills and in the mountains, we will presently see that the Northern exerge has apparently the superiority over the Central one in determining the aspect of the races.

(To be continued.)

CURRENT NOTES AND SHORT NOTICES.

The *Mem. Soc. ent. Italiana* Vol. VI., fasc. I., contains an obituary of the world famous Prof. Antonio Berlese, who was the author of that great work "Gli Insetti," recently completed in two large volumes. He was born in 1863 and was in his 64th year at the time of his death in 1927. He held many decorations and was honorary member of many foreign societies including the Entomological Society of London to which he was elected in 1915. There are two portraits of him one taken at the age of 20 and another in 1916.

The *Ent. News* for November contains a very interesting account of Mark Catesby the early explorer of Carolina, Florida and the Bahamas from 1712 to about 1726, and the author of the famous "Natural History of Carolina," an imperial folio work consisting mainly of plates. In the second volume are figured some twenty-six species of insects.

We learn that the Entomological Society of America has recently received a handsome bequest of \$1,000,000 from the late Miss Mary Soule.

We have recently received an account of the R. Laboratorio di Entomologia Agraria, at Portici, Naples. The book is well illustrated with 16 beautiful photographs of the Institution, interior and exterior,

the gardens and experimental grounds. There is an account of the history of the institution from its inception in 1876 until the present time. There are accounts of the Collections, the Library, the gardens and the publications. From 1906 the institution has published annually the *Boll. Lab. Zool. gen. e agrar.* Prof. Filippo Silvestri has added a list of titles of articles of which he is the author since 1904.

We have received a volume on the *Aphid Fauna of Lettland*, by Prof. Embrik Strand, illustrated with numerous figures. It contains a very full list of plants with the names of the Aphids which have been found associated with each, together with a serviceable bibliography. At the same time we received seven separates, one on the *Spiders of Hallingdal in S. Norway* by the same author; four of the others were lists of the very numerous descriptions of Exotic Heterocera, Noctuides, Hymenoptera and insects of other orders, published by Prof. Strand previous to the year 1926.

B I T U A R Y .

Jaques-Louis Reverdin.

From his early childhood, Jaques-Louis (b. 1842 d. 1929) was an ardent lover of natural history and art. Born at Geneva, where he studied at the Académie and the University, he took the degrees of B.A., and B.Sc. and in 1862 went to Paris to continue his medical studies. In 1865 he was appointed doctor in the central hospitals and won the gold medal in 1869. The Franco-German war being declared he became chief surgeon of the ambulance created by the Swiss colony. During this period he invented the system of grafting skin on to wounds in order to hasten their healing and this epidermic grafting, published in 1872 brought the young surgeon fame and high honours. Despite the proposals made to him by the medical authorities at Paris, Reverdin returned to Geneva and at once won for himself the highest honours. His seniors were startled by his antiseptic methods, which resulted in what passed then for miracles.

From 1874 to 1882 he was surgeon of the cantonal hospital, and a Faculty of Medicine having been created at Geneva University, he was at once appointed Professor of Pathology and of Surgery. For 34 years he continued to teach young doctors and has stimulated and guided a large percentage of the present day Swiss medical men. In 1882 and 1883 he made most useful discoveries concerning myxoedema, and saved many lives by proper handling of the thyroid gland in cases of goitre. In 1904 I had the pleasure of making a friend of the great scientist and persuaded him to join me in founding the "*Société Lépidoptérologique de Genève.*" From 1905 to 1929, Dr. Reverdin has been a whole-hearted lepidopterologist. In England he is well known as an authority on the genitalia of several families, especially on the male genitalia of the skippers. His activities continued till the very end. When I went to see him last August, spending with him the day that was destined to be his last birthday, I found him working with his microscope and though feeble in body his mind remained as active as ever. Always cheerful, he accepted the infirmities of age as part of the game of life and did not even complain when forced to give up his field work.—P. A. H. MUSCHAMP.

CORRECTION.—p. 52, line 22 should read "St. Ives, Huntingdonshire."

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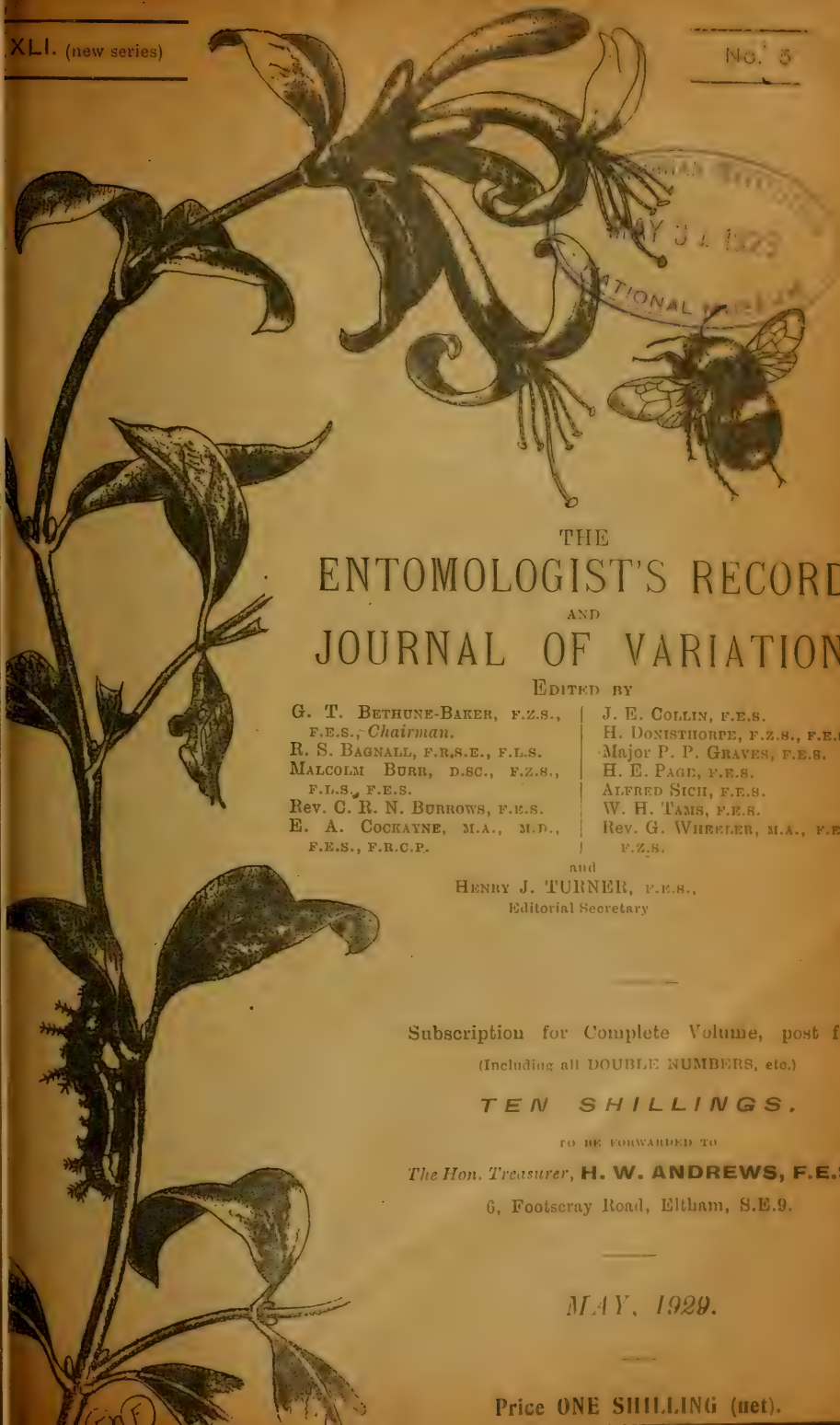
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Wyre Forest Area. I. Diptera.

By C. J. WAINWRIGHT, F.E.S.

(Concluded from page 39.)

Two other uncommon but less notable species of Tachinids have also been captured on willow bloom; *Campylochaeta obscura*, Fall., and *Brachychaeta spinigera*, Rond., but only odd specimens have been taken of each. Another fine Dipteron, which one finds on the willows in the Spring, although it is not particularly associated with them, is the well known *Bombylius major*, L. On April 22nd, 1919, it was in abundance, and in evidence throughout the Forest, and there were many on the willows in the company of the species already referred to: I have never seen it in such numbers on any other occasion and usually it is seen singly flying over dry banks and similar spots, where it is in the habit of laying its eggs. On one occasion, on May 8th, 1909, I found a single *Bombylius discolor*, Mik., a species which seems to be a more southern insect as this is only the only one recorded from the Forest, but we have never met with it elsewhere in the Midlands.

Between Easter and Whitsuntide opportunities for collecting in the Forest have been few, but the latter date has always been popular for collecting holidays and I have visited the Forest on several such occasions. At this season of course vegetation is well forward and insects numerous everywhere; but as at Easter it is the willow, so at Whitsuntide it is the hawthorn bloom that serves as the great attraction, and many of our captures were made from its blossoms. It was on the flowers of a low hawthorn hedge that I caught what is perhaps the greatest rarity and most striking fly that has been taken in this area, namely, *Doros conopseus*, F. This was taken on May 27th, 1896, and so far as I know only one specimen of this fine species has been captured anywhere in England since that date, and not many British occurrences have ever been noted. It seems difficult to believe that a species like this should have been exterminated, and indeed I think it is extremely likely that it is there all the time, and if we only knew its haunts, could be found regularly. It has been suggested that there is some association between it and ants, but this rests on very slender information. The species bears considerable resemblance to a wasp of some kind, but this is probably purely protective and need not involve any connection with Hymenoptera at all. It is worth looking for and I hope Dipterists will find it again in the Forest and trace its life-history.

Another fine rarity was also taken on hawthorn in this locality, this time by Mr. R. C. Bradley, namely, *Pocota apiformis*, Schrank; it is another of the bee-mimics and obviously resembles a *Bombus*. Mr. Bradley took one specimen only on June 24th, 1894, and like the last species very few other British specimens have been recorded either before or since, and being so large and handsome it has been constantly looked for. The species of the genus *Criorrhina*, which is very closely allied to *Pocota*, are much commoner, and besides *ranunculi*, Panz., referred to above, *asilica*, Fall., *oxyacanthae*, Mg., and *berberina*, F., are to be found regularly, though never in abundance, and especially upon the hawthorn.

Still another rarity, of which one single specimen has been taken

at hawthorn here, is *Cheilisia chrysocoma*, Mg. This I got on May 22nd, 1920, in rather bad weather conditions, so that in better circumstances at the same season and place it may be possible to get it again and more than singly.

Generally speaking the hawthorn blossom is more or less crowded with *Syrphidae* of many kinds, when it is sunny, mostly however of the more common and less noteworthy types. *Syrphus annulatus*, Zett., is perhaps worthy of mention as being specially associated with these flowers.

The only *Tachinidae* that I can recall in this connection are *Ernestia truncata*, Zett., one of the less common species, and *Pelatachina tibialis*, Fall., which I found commonly on one occasion on a hawthorn hedge.

From Whitsuntide onwards through the summer collecting becomes more general and there are usually plenty of flies in evidence, though I do not think that I could say that the Forest ever proved rich in noteworthy species of *Diptera*.

Of the *Tabanidae*, *Tabanus distinguendus*, Verrall, is the only one of the larger species which occurs regularly, it is common enough; of *T. sudeticus*, Zell., I found a few on one occasion only in one small area in the corner of a field in the valley, and it is certainly rare. The smaller species are better represented. *T. bromius*, L., *T. maculicornis*, Zett., and *T. cordiger*, are not uncommon, and of course *Chrysops caecutiens*, L., and *Haematopota pluvialis*, L., are abundant enough, but no other species seems to occur so that the Forest must be said to be poor in *Tabanidae*. It is poorer still in *Asilidae*; *Dioctria* is represented by *D. oelandica*, L., which is common and conspicuous, *D. atricapilla*, Mg., *D. baumhaueri*, Mg., and of course *D. rufipes*, Deg., but the *Asilinae* are represented only by *Machimus atricapillus*, Fall., and that is extremely rare, so that the Forest seems almost outside the range of the Family. The *Stratiomyidae* again are but poorly represented, only such things as the commonest species of *Sargus*, *Microchrysa* and *Beris* having been detected; perhaps it is too dry an area for many of the family.

Of the *Leptidae* that remarkable species *Atherix ibis*, F., occurs on the banks of the Severn at Arley, though it has not actually been taken in the Forest itself, but I should expect it to occur on the Dowles; and the very rare Therevid, *Psilocephala ardea*, F., was once taken by Mr. R. C. Bradley by the Dowles on July 7th, 1889, when he obtained two females.

The *Syrphidae* are well represented, for besides species already mentioned, *Xanthandrus comtus*, Harris, occurs in the late summer, but only rarely; the beautiful *Leucozona lucorum*, L., is common; *Didea fasciata*, Mcq., usually so rare, may be regarded as a regular Wyre Forest species, although I think we have actually only met with it on one spot, an open meadow above the railway; it may be due to chance that it is only in the late summer that we have taken this species, when it and a few other rare *Diptera* have attracted us to the Forest on a number of occasions in special search of them. *Didea alneti*, Fall., has also occurred once or twice. The genus *Syrphus* is represented by many species, amongst them *S. albostrigatus*, Fall., *S. tricinctus*, Fall., *S. lineola*, Zett., *S. grossulariae*, Mg., and *S. auricollis*, Mg., and *S. bifasciatus*, F., is extremely abundant, as I fancy it is in all woods.

Brachyopa bicolor, Fall., was found once by me in some numbers just outside the Forest; it was attracted to the foot of a particular tree, where I caught a series, but without being able to decide what it was that brought them there. *Xylota sylvarum*, L., is common as well as the ubiquitous *X. segnis*, L. *Chrysotoxum elegans*, Loew., and *Chrysochlanys cuprea*, Scop., both occur, but only rarely.

The *Conopidae* are well represented, indeed if I remember correctly Mr. R. C. Bradley once took all the 5 British species of *Conops* on one day in late summer. *C. vesicularis*, L., occurs regularly, at Rhododendron flowers in one sheltered little valley, in the spring, the others seem to be more in evidence in the late summer but are all very rare excepting *C. flavipes*, L.

Amongst the *Tachinidae*, besides the species already mentioned I have taken the following:—*Hyalurgus lucidus*, Mg. on *Umbelliferae*; *Gymnochaeta viridis*, Fall., on tree trunks, in the spring; *Carecia comosa*, Rond., *Bactromyia aurelenta*, Mg., a rare and little known species; *Ptychomyia selecta*, Mg.; *Fricaldzkie incpta*, Mg.; *Histochoeta marmorata*, F.; *Actia frontalis*, Macq.; *Degeeria muscaria*, Fall., and *Frauenfeldia rubricosa*, Mg.

As already mentioned we were tempted to visit the Forest a number of times in September in search of the *Didea* and rare *Conops* and other specialities and I recall some glorious days at that season, when with plenty of autumn flowers and especially ragwort to attract them, the Forest seemed alive with flies. Apart from the rarities mentioned and *Xanthandrus comtus*, which flew at the same times and places, there were a few of the comparatively uncommon Tachinid, *Myiocera carinifrons*, Fall., and great numbers of certain common ones, notably *Echinomyia fera*, L., which I have seen in such numbers as to constitute the most obvious feature of the insect life of the Forest at the time, literally occurring in thousands; and with them was *Micropalpus vulpinus*, Fall., in smaller numbers but also conspicuous, and *Eriothrix rufomaculatus*, Deg., a species which seems generally to be common wherever ragwort is flowering freely.

I am afraid that the above is but a sorry list of *Diptera* from this beautiful district, but I hope at least that it may serve to interest others in the locality; and in spite of the changes already taking place in its character, it will, I am sure, pay for attention. None of my notes seem to have much bearing upon the said changes, and indeed it is quite likely that none of the species referred to are really going to be materially affected in their incidence, excepting that they may be restricted in their distribution. *Diptera* are generally very powerful fliers and may easily wander a long way and it is rarely certain that a species caught in a given area really belongs to it. Of course many of the *Lepidoptera* specially associated with oak woodland must disappear more or less from the parts that are going to have oaks replaced by conifers; and the parasites, dipterous and otherwise, which prey upon those particular *Lepidoptera* will go with them; but there is likely to be enough oak left for a long time yet to give plenty of opportunity for studying this particular association of insects.

The Asiatic origins of the Western Palaearctic *Rhopalocera* exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

(Continued from page 67.)

SYNEXERGES PRODUCED BY CROSSINGS OF EXERGE DIDYMA, ESP., WITH EXERGE DALMATINA-CAUCASICA, STGR.—Race RUBIDA, Vrtty., with *subrubida*, Vrtty., as defined above, appears to be the most broadspread and characteristic, if not the only race, all over the northwest of Germany, Belgium, and north-eastern and central France, as far south as the Lot department. To all appearances its features are due to the merging of these two exerges ever since *didyma* arrived from Siberia, after the last Glacial period, and met the Central exerge, which had left its southern refuges, in Italy and in the Balkans, and had begun to spread northward through France. The form *subrubida*, Vrtty., is the one in which on both surfaces the more reduced black spotting and the lighter and brighter tone of fulvous show more markedly the influence of the Central exerge.

In the north-west of France also, race ARMORICANA, Obth., obviously exhibits a combination of the shape of the wings and of the long white fringes of nominotypical *didyma*, with the very clear, vivid tone of fulvous and the reduced black markings of the southern races.

In the south-west of France the features of the Northern exerge decidedly surpass those of the Central one in the very fine race I propose naming **garumna**, although its large, and often very large size, and the breadth of wings in the female, as well as a minority of individuals, which are quite similar to *protea*, unmistakably reveal a strong strain from the Central exerge. The race it resembles most is *oreithyia*, Frhst., of Trieste, but in the latter the proportion between the influences of the two exerges is reversed and the colour is duller and more discoloured, on account of the aridity of that region. In *garumna* the shape of the wing is not as broad, the fringes are longer and whiter, the black markings bolder, the fulvous richer and redder. The females, however, give, as compared with most races, the impression of having a pale, dull, yellowish fulvous ground-colour of a uniform tone, but often markedly paler on the forewing; one of my females from the Vernet has a light greenish suffusion over the basal half of it. I take as typical my July specimens of Vernet-les-Bains in the Pyrénées Orientales, and I have others of May to July from Ambollos and a large May and June series from Villandraut in the Gironde. The remarkable difference of the II. generation of this race actually confers to it nearly exactly the same look as nominotypical *didyma* of some localities of Central Europe, such as a series I have from Karlstein, in Bohemia. It only differs from the latter by the clearer and slightly more yellowish tone of fulvous and by the considerable reduction of the black patch along the dorsal margin of the hindwing, which acquires more the aspect of a basal shading of greater or lesser extent. I have a long series from Garzac and St. Laurent d'Arce, in the Gironde, of the second half of August and the first days of September, which I name **postgarumna**.

The extremely alpine-looking race from Gèdre, m. 1100, in the Hautes Pyrénées, I should decidedly classify here. The greater part

of the males are exactly similar to those of *subalpina*, but a few are quite different and resemble *armoricana* by their long pointed wings, their much lesser black spotting and their light, vivid fulvous. The two latter features evidently reveal a strain from the Central exerge and the female sex confirms it. The only races they can be compared with are the race of the S. Tyrol I will presently describe as *navalpina* and, curiously enough, to a certain extent, the true *meridionalis*, Stdgr., of Sicily. It has in common with them the small size of the black spots and especially the nearly uniformly even suffusion of grey scaling, which covers the whole of the wings, except the deep fulvous forepart of the hindwing (these two features are due to the Central exerge). It differs from *navalpina*, and much more so from *meridionalis*, by the deeper tone of grey. and, as nearly all the females are of this dark *alpina* form, it is one of the most melanic races of *didyma* in Europe. I distinguish it by the name of **pyrenealpina**.

On the Mt. Aigoual, in the Cevennes, at and above 1000m., there is a race which cannot be ascribed either to *subalpina* or to *seilemis*, nor can it be treated as a transition, because none of the individual variations, I have seen, ever exhibit the average characteristic aspect of these races: the males are more like those of *subalpina*, but larger and of a brighter and richer colour; the females are more like the smaller ones of *seilemis*, of which they have the broad wings and the rich colouring, but the black spotting is not as bold, showing the influence of race *protea*, Vrtz., which inhabits the warm and dry localities in the plains of the Gard. I am encouraged to name the Aigoual race **subseilemis** by some specimens from Barcelonnette, 1100m., in the Basses Alps, which lead me to think there are in the south-east of France many localities, whence it would be quite inaccurate to name the *didyma* either *subalpina* or *seilemis*, whereas the intermediate definition I have just given covers them exactly.

True *SEILEMIS*, Frbst., from the Alpes Maritimes (presumably the Col di Tenda) and Saint Martin de Vesubie, is a very striking race of remarkably large size, comparable to *tarlonia*, of the southern watershed of the Simplon, but still larger, of a deeper tone of reddish fulvous and with the black pattern more developed, most females having the forewings darkened by greenish and blackish. Turati has a long series of specimens from the Col di Tenda and from the mountains above Ventimiglia, in which the form described by Frühstorfer is certainly prevalent, but it is mixed with specimens, which are exactly like my *subalpina* of the Susa Valley by their smaller size and their dull colours; about 25% of the females are of the clear ochreous form, which is prevalent in *tarlonia*. These and the very large size of some *seilemis* obviously suggest that this race has been produced by the intermixing and interbreeding of the race *subalpina* of the northern exerge, which has pushed southward along the Western Alps, with races *subpatycosana*, and *entitania* of the Central exerge, which had got there from the south-east.

The race which resembles *subseilemis* most is the one which stands to *tarlonia* as the former stands to *seilemis*. I have collected it from the 2nd to the 9th of June on the Pian Quaggiù, now called Pian del Sole, at 900m., in the mountains above Intra, on Lake Maggiore. It differs, however, distinctly from *subseilemis* in the same way that *tarlonia* differs from *seilemis*, by the black spotting being very

much lesser in both sexes, including the basal suffusion; it thus is clearly a grade nearer to race *protea* of the Central exerge and it must be distinguished as **subtarlonia**, this name being suggested by the fact it is like *tarlonia*, but much smaller.

I have already stated in the *Ent. Rec.* of 1924., suppl. page (37), that at the Pian del Sole the I. generation is bipartite, like I have found that of *protea* to be in Florence, and that its later emergence began about the 18th, after a pause of nine days. Notwithstanding its altitude of 900m., that locality is so parched that it produces at that season a *didyma*, whose male is very similar to those of *marsilia*, Frhst., in which the black spotting is less reduced, the fulvous being of a light tone, mixed with yellow, and whose female can be described as intermediate between the one of *subalpina* and the one of *marsilia*: the black spots are intermediate in size; the pattern generally is very complete, but the inner submarginal row of spots, though usually broad, is grey, contributing to give the whole pattern a soft, pasty look, increased in some examples by a slight grey, suffusion around the spots of the basal half of the wing; the fulvous is uniformly of a yellowish tone, very much like *marsilia*, as distinguished from the more ochreous *caldaria*; in the two latter, however, it is more conspicuous, because the spots are sharper in outline and stand out on the clear groundcolour. I suggest the name of **praemarsilia** for this form, which precedes *marsilia* both by its aspect and by its time of emergence. I possess a series of exactly similar specimens from the lower Piave (as well as a set collected by Graves at Lulin, 900m., near Sofia, in Bulgaria, on July 5th), to the east, and from some localities of southern France, to the west (coll. by Foulquier on June 28th at the Sainte Baume, 1000m. in the Var, and on July 10th in another locality; coll. by Graves in the Causse Noire, 1000m. on July 11th and at Le Rozier, 600m. in the Loz. et Aveyron, from July 10th to 15th; perhaps at Digne, judging by a single female). I conclude it is broadspread in many dry localities of the Northern Balkans, of the whole Po Basin and of the south of France, and that very likely in the most arid ones it constitutes the entire I. generation, and it is thus quite racial, just as in the case of *romana*, Calb., in Peninsular Italy. Presumably in the dampest localities of the Po Basin *subtarlonia* replaces it entirely in the Prealps, whilst in the lowlands a third race is the most likely to be predominant.

I have a long series of specimens of the latter collected in the plains near Intra from April 28th to May 4th. It can only be described as a large and gaudy southern race of the nominotypical exerge: it is the most richly coloured race of the species I am acquainted with from Europe, of a deep, bright red on both surfaces; this colour stands out, together with the thick black streaks, on underside, on a pure white ground colour, as in nominotypical *didyma*; the black markings above are usually as in the latter in both sexes, but in 25% they are less developed and the fulvous is then also less deep in tone, showing that a strain of *tarlonia* has got mixed in this race, which I think one can only consider as a northern invader; of the females some are exactly like those of Central Germany, others like the figure Seitz gives of the Asiatic *ala*, highly coloured and with thick black spotting and also of that size. I name the first generation of Intra **igneae**, but I suppose

it is the Tessin race, whose "autumnal"* generation, of very small size and of a pale ochreous colour, has been named *georgi* by Frühstorfer. He thought the latter was a third generation, but since I have concluded the early summer emergence cannot be a II. generation, as Frühstorfer seemed to think, his *georgi* must be considered the true second one.

That author's *MARSILIA* is, I think, best dealt with here: he describes it from "the Riviera and Marseilles, near the coast" as being in the male sex of a "yellowish brick-red," with the "black spots only a little more prominent than in *dalmatina*" and in the female sex "prevalingly of the yellow-brown type and considerably smaller than the *Alpes Maritimes* females." He adds the underside is pale in colour and with narrower bands. This description unmistakably applies to the second generation. His statement that the black spots are a little "more prominent than in *dalmatina*" and that the female is only "prevalingly" of the yellow-brown type fixes the average and most common Riviera form as the typical one of *marsilia*. There are in this region more extreme individual forms, in which the black pattern is quite as restricted as in *caldaria* (the usual form of Dalmatia, called *dalmatina* incorrectly) in both sexes, and there are particularly parched localities, especially of the hinterland, where this form and the light ochreous females of *caldaria* constitute the II. generation nearly entirely, the I. generation in these cases being quite similar to *protea* of Italy. Such are, for instance, the Champ de tir of Nîmes and the garigues of Prime Combe, near Soummières in the Gard, and Casale, Nizza Monferrato, Acqui and Ponzzone, 600m., in southern Piedmont, whence I have series of specimens, all collected in the first half of August. As they are constituted by a mixture of two named forms, it would be wrong to erect a third name for races of this sort and I think the correct designation should be *CALDARIA-MARSILIA*, Vrtty.-Frst. These extreme forms and races might appear to belong to a pure strain of the Central exerge, but what makes one include *marsilia* amongst these synexerges is that its variations in the opposite direction distinctly point to nominotypical *didyma*, whereas this is never the case in true *caldaria* of Italy. I restrict the name of *marsilia* to those forms in which the various rows of spots are of different sizes and shades of black and the fulvous is richer and warmer than in *caldaria*, answering better to Frühstorfer's expression of "yellow-brown," in connection with the female. All my specimens, of August 8th, from Saint Zacharie, 600m., in the Var, are of this description.

On the contrary, the ten females I have from Douelles, in the Lot, belong to a third form of the second generation, in which all the rows of spots are of about equal size; in the majority they are large and roundish, with a clean-cut outline, so that they stand out boldly on the pale, dull ochreous ground colour, recalling the look of a leopard skin; this form thus corresponds to race *leopardata*, I have described from the Isle of Elba, but it differs from it by its much smaller size and very

* Probably of the end of the summer rather than really of the autumn.—In my spring series of *Intra* there is a superb aberration I have seen figured or described nowhere, which has all the yellowish white ground colour of underside at apex of forewings as well as on hindwings, replaced by a uniform, deep velvety black; on this stand out sharply the usual fulvous bands; it is a male: ab. *atrarubra*. No white scales are left along the nervures as in Oberthür's *radiata*, fig. 139 of the *Ét. Lep. Comp.*, vol. III.

much duller colouring, except in one rich, reddish, fulvous specimen : form and race *microleopardata*. Also the I. generation from the Lot, as shown by a series of June 30th from Cabrerets, differs in exactly the same way from the *protea* of Nîmes and of Italy : considerably smaller size, heavy black markings, particularly noticeable in the large round spots of the central elbowed row, fulvous dull, whitish on forewing of female except in one, which is of a richer, reddish tone on all the wings ; this I. generation belongs to *rubida*, Vrtý., and *subrubida*, Vrtý., and I do not detect the slightest difference between it and my Berlin examples.

To finish with the very varied races and seasonal forms of France I must record a race perfectly identical with *subpatycosana*, Vrtý., of the coasts of Tuscany and Liguria and thus quite a pure strain of the Central exerge, which has been found on June 24th by Gaillard in the marshes of the Aigues Mortes, on the coast, south of Montpellier. A female of August 31st from a swampy spot in the bed of the Vidourle river, near Gallargues, half way between Montpellier and Nîmes, and a series of August 7th from the Bouches-du-Rhône, exhibit a remarkably unusual aspect for the II. generation ; they are much larger than any other I have seen, being of the size of *protea* and *romana* ; the wings are broader than in these, but not as much as in *subpatycosana* ; in extent of pattern and in colour eight, out of my ten females, compare best to *romana*, except for the tone of fulvous, which is duller and more whitish ; the two others are transitional to *subpatycosana* by their bolder pattern and their richer and much warmer fulvous. Amongst my females from the Aigues Morees one is quite similar to the eight of the II. generation. I thus infer that the latter belongs to the same race as the *subpatycosana*, replacing the *romula*, Vrtý., which this race produces in its II. generation in Italy, and I name it *magnaestiva*.

(To be continued.)

Description of Larva and Pupa of *Actinote pellenea* subsp. *calymnar* Jord. f. *zaratensis*, Ob.

By CAPT. K. J. HAYWARD, F.E.S., F.R.G.S.

Length 20 mm.

Head brownish black with some grey hairs.

Ground colour of dorsal and lateral area dark smoky brown, merging into the underside colouring on the thoracic segments but terminating in a straight line at the margin on the abdominal segments.

The dorsal area of the 1st thoracic segment brownish black.

A large squarish greenish-yellow patch on either side of the dorsal line, covering most of this area, suffused with light brown on the thoracic and first two abdominal segments, and slightly on the 6th to 8th, having hairy spines, greenish-yellow brown tipped on the 3rd to 5th abdominal segments but brown on the remainder, the hairs of the same colour as the spines.

A double transverse line just forward of the fold of the same colour as the dorsal patches.

On the lateral area a series of slightly smaller similar greenish-yellow spots, each bearing a dark brown hair-clothed spine. A row of maginal spines, dirty white tinged with brown.

Beneath, dark green on the thoracic segments, the legs black, on

the abdominal segments greenish-white irregularly marked with light green and with brownish lines.

The larva was found crossing a trestle bridge over the estero Norte (Mocovi) at Km. 11½ on the ramal al Oeste, slightly to the West of Villa Ana, Prov. of Santa Fé. Argentine, on November 10th, 1928. Commenced to pupate on the 11th.

From the position of the larva when found one must suppose that it had been feeding on one of the many water plants growing so profusely in the estero, as the distance—as the caterpillar would travel—from any dry ground was considerable.

PUPA. An angulated pupa suspended from a silken pad.

General ground colour chalk white, heavily covered with brown as follows.—

Head mottled dark brown, the frontal plate brown. The thoracic segments more brown than white with a heavy dorsal brown stripe through which the white ground colour appears faintly in places. Abdomen with five longitudinal brown stripes, the upper lateral wider, the second pair on the margin, and a central stripe below. All these stripes are mottled with the ground colour more or less suffused with brown, the lateral stripes with a distinct white spot centrally on each segment, immediately behind which on the first five abdominal segments is a short smooth black spine 0.8 mm. in length.

Wing cases olive grey, the venation black and very distinct

Legs, antennae, and mouth organs olive grey.

Pupated Nov. 11th. Emerged between 7 and 8 p.m. November 21st.

Imago sent to the British Museum under No. 7600, empty pupa case under No. 7601.

Further remarks on the rearing of *Callophrys avis*, Chap.

By BRIGADIER-GENERAL B. H. COOKE, C.M.G., C.B.E., D.S.O.

In the December number of Vol. XL of the *Entomologist's Record*, I recorded my experience in rearing larvae of *Callophrys avis* from ova laid by a female captured by me in April, 1928, at Cavalière on the Riviera coast. As stated in that article the total number of pupae obtained was 22, and it may interest readers to hear how these pupae fared. During the winter they were kept on moss in a flower-pot half filled with earth and covered with muslin, the flower-pot being placed in a room which was not artificially heated. The pupae were taken three times across the Channel between England and France during that period.

About February 20th last when the frost in England was exceptionally severe, the flower-pot was transferred to a room in which a fire was burning all day, and the moss was sprinkled daily with water.

On March 6th a rather small male emerged, and on the 7th the weather changed and we had a warm spell, the temperature at mid-day on the 9th being 65° Fahr. in my garden.

On the 10th two more males emerged at about mid-day. The 11th being a lovely warm day the flower-pot was put out in the sun and the pupae were sprinkled with water. At about 1 p.m. three butterflies emerged, 2 males and one female.

The 12th was not quite so warm, but one male appeared about mid-day. From the 13th to the 16th inclusive the weather was dull and colder again and no emergences took place. I was away from home on the 17th and 18th and placed the flower-pot in semi-darkness to discourage any emergences during my absence. March 19th, however, was warmer again with a hazy sun to which I exposed the flower-pot, with the result that 6 butterflies appeared between 1 and 1.30 p.m., 2 males and 4 females.

On the following day, which was again warm and sunny, one male put in an appearance, also about mid-day, and on the 22nd, also a mild fine day, one male and two females emerged at about 10.30 a.m.

Thus of my 22 pupae 17 (*i.e.*, 10 males and 7 females) had emerged between March 6th and 22nd, a period of 17 days. The remaining 5 pupae dried up and died, but as far as it is possible to tell they consisted of 3 males and 2 females.

The tabulated results were therefore as follows:—

		MALES	FEMALES
Emerged on	6th	...	1
"	" 10th	...	2
"	" 11th	...	2
"	" 12th	...	1
"	" 19th	...	4
"	" 20th	...	1
"	" 22nd	...	1
Died as pupae		...	3
Total		13	9

On the whole, perhaps, 17 perfect specimens out of 42 eggs was as good a proportion as one could have expected considering the journeys and changes of climate to which they were submitted, but the number of casualties makes it difficult to draw any definite conclusions from the experiment. As was to be expected the females on the whole emerged later than the males, and in most cases the emergences took place after mid-day, although the pupae were exposed to the sun early in the morning.

Variation in these specimens is practically confined to the ground colour of the upperside, which is on the average darker in this brood than that of other specimens I have taken previously, although the female parent was not unusually dark. Most of the females are, as usual, redder than the males, and the veins are less conspicuously outlined in black. The undersides are practically identical except that the wavy greenish-white line is lighter in some specimens than in others. In all cases this line extends across the upper half of the forewing, and across the whole of the hindwing to within a very short distance of the inner margin, the little curved dashes of which it is composed forming practically a continuous line.

The Food of the Trout.

The flies which are the natural food of the trout have been ascertained by numerous observers during the past season, in some dozen fishing stations, mainly in Ireland, the western side of England and Wales, and Wicken Fen. Various fishers sent up their captures to a

committee in London and the following are the species identified. It will be seen that the bulk of the species belong to the different families of the Trichoptera. Apparently systematic records of such have not previously been made.

PERLIDAE.—*Chloroperla grammatica*, *Isopteryx tripunctata*, *I. torrentium*, *Nemoura avicularis*, *N. cinerea*, *Leuctra klapaleki*.

EPHEMERIDAE.—*Baetis pumilus*, *Baetis* species, *Ephemerella ignita*, *Ephemerella danica*, *Ecdyurus lateralis*, *Siphonurus armatus*, *Leptophlebia submarginata*.

SIALIDAE.—*Sialis lutaria*.

TRICHOPTERA.—*Mystacides nigra*, *M. azurea*, *M. longicornis*, *Phryganea grandis*, *P. varia*, *P. obsoleta*, *Oxyethira costalis*, *O. saggitifera*, *O. friei*, *O. simplex*, *O. tristella*, *Hydroptila simulans*, *H. angulata*, *H. forcipata*, *H. femoralis*, *H. occulta*, *Leptocerus commutatus*, *L. aterrimus*, *L. dissimilis*, *L. interjectus*, *L. albifrons*, *L. cinereus*, *L. fulvus*, *Hydropsyche instabilis*, *H. guttata*, *H. lepida*, *Holocentropus picicornis*, *H. auratus*, *Lype fragilis*, *L. reducta*, *Polycentropus flavomaculatus*, *P. multiguttatus*, *P. kingi*, *Æcetis furva*, *Æ. lacustris*, *Æ. testacea*, *Æ. ochracea*, *Limmophilus flavicornis*, *L. marmoratus*, *L. auricula*, *L. affinis*, *L. lunatus*, *L. sparsus*, *L. hirsutus*, *L. decipiens*, *Rhyacophila munda*, *R. dorsalis*, *Halesus auricollis*, *H. radiatus*, *Lepidostoma hirtum*, *Neuroclipsis bimaculata*, *Cynurus trimaculatus*, *Wormaldia subnigra*, *Chimarra marginata*, *Grammotaulius atomarius*, *Plectrocnemia conspersa*, *Ithytrichia lamellaris*, *Sericostoma personatum*, *Glyptotaelius pellucidus*, *Tinodes waeneri*, *Colpotaulius incisus*, *Agraylea pallidula*, *Anabolia nervosa*, *Agapetus fuscipes*.

CURRENT NOTES AND SHORT NOTICES.

I should much like to correspond with those who have worked with Tutt's *British Noctuae* and who have other forms to record or have come to other conclusions as to the variation in any species.—
HY.J.T.

The year, from an entomological point of view, was summarised by M. P. Marechal in *Lamb.*, as, on the whole characterised by a superb summer such as has not been seen for a long time, but the spring was wholly wanting. April was really bad, May a little better, June somewhat good, July very fine, August somewhat uncertain, September, magnificent, October downright bad.

Sometime ago we noticed a very exhaustive account of the "Macrolepidoptera of Digne" by Rudolf Heinrich which appeared in the *Deut. Ent. Zeit.*, Berlin. We now have to announce the first supplement to the account, of about 30 pp. by the same author, bringing the records up to date, with a few corrections and omissions.

In part 4 of *Iris*, Dr. A. Corti continues his "Studies of the Agrotinae," this being the nineteenth communication. He describes 3 new species of Palaearctic *Euxoa* and notes on several other *Euxoa*, including the *alborensa*, Tschetverikov form of *Feltia* (*Agrotis*) *ripae* which is figured. The writer says that the name is a synonym of *dukei*, Gr.-Gr. and of *chamyli*, Bng.-Hs., and refers to his own notes *Zt. f. Wiss. Ins.*, 1927, p. 286, ff.

In recent issues of *L'Amateur de Papillons*, M. Charles continues his notes on the French Acidalias. In the October number our

valued correspondent Mr. W. Fassnidge writes his observations on *Synanthedon flaviventris*. In the November number the talented editor gives an account of various devices for the rearing of larvae, with illustrations.

In Vol. XLII of *Ann. Naturhist. Mus. in Wien*, the authorities have got quite back to their old output of valuable work. Among the various Zoological articles is a valuable contribution by Dr. P. Lakschewitz on the Palaearctic *Limnobiinae* (Diptera) with figs. and 2 pls.

The *Deut. Ent. Zeit.* pt. III (1928) contains a contribution on the history, etc., of *Polyommatus thersites* with figures of the local forms, and of var. *alexius* and of var. *gravesi*. Dr. Stichel continues his notes on the *Erycinidae*, with 3 plates. And there is Herr Heinrich's supplement to his account of *Digne* (see above).

On a recent lecture by Professor E. B. Poulton, D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.E.S., Hope Professor of Zoology in the University of Oxford.

"Go to the Ant," King Solomon
Enjoined upon his sluggard race.
Now, Professor E. B. Poulton
Reveals its falling out from grace
By getting inebriated.
Alas, this failing intends to show
The Ant's degenerated.

Antwards the sluggard must not go!—G.C.L.

We have received a small volume from Messrs. Gebrüder Bornträger of Berlin, "A Practical Introduction to the Morphology of Insects," being a handbook for scholars, students and entomologists generally by Dr. Ed. Handschin. It is a volume more than a hundred pages of very well arranged matter and an atlas of 23 plates of extremely clear and well labelled figures. Each section has a short bibliography, a list of the material wanted for the practical work given in the chapter, with close detailed instruction for handling each subject. In fact it is a course for any one who wishes to take up entomology as a profession as well as useful for the scholar and the general entomologist. There is an admirable index; not always the case in a smaller treatise.

In *Lambillionea* for Aug.-Sept. M. Cabeau describes two new aberrations:—(1) ab. *ochrea* of *Erastria fasciana*, in which the forewings are of a rufous brown with all the lower portions of the terminal and sub-terminal spaces and the fringes pale yellow. (2) ab. *leucophans* of *Melitaea aurinia* in which the upperside of the forewings has the typical black markings but the ground of a slightly yellowish white, while the ground of the hindwings is of the normal fawn colour.

In no. 8 of the *Bull. Soc. ent. France* Dr. Verity describes some new races and points out several cases in the synonymy of the Grypocera; some of the names concerned being what has been termed homonyms. A wretched custom seems to be becoming more frequent, viz., that of altering all names of varieties if they occur more than once in the genus. For instance if the name *flava* has been applied to a variation of several species in a genus it is only valid once and all the rest must be altered, although the term may be the most applicable. To us this situation is mere jugglery with words, serving no scientific purpose, diverting time and attention from the biological problems

to be investigated: the dog dropping his meat for the shadow. Yet this is all in accordance with "the Rules"!!! The following is a list of alterations, etc. Dr. Verity advocates, *Hesperia carthami* race *microcarthami* in place of *pyrenaica*, Warren, Tutt having used *pyrenaica* in relation to *H. malvoides*: *H. armoricanus* race *lecerfi* in place of *reverdini*, Le Cerf., praeoccupied in *H. reverdini* of Obthr.: he names *H. alveus* race *warrensis* the alpine form figured and described by Warren, *Trans. Ent. Soc. Lond.* 1926, p. 120, pl. XLIII.; corrects an error in the *Ent. Record* 1925, p. 56. in attributing examples taken at Sudden to *H. bellieri* whereas they are proved by their armature to be forms of *H. alveus* and he names them *bellieriformis*: substitutes *Sloperia proto* race *macropoto* for race *gigas* praeoccupied in *Tuttia gigas*: *Glaucopsyche cyllarus* race *maritimalpium* for *alpina*, Trti. et Verty, preoccupied in *Plebeius idas*, and to the same species adds the race *melenoposmater* from Algeria, and the race *subpauper* from Cannes: and adds to *Scolitantides baton* (= *Turania hylas*) the two races *praepanoptes* and *madriti* from the Pyrénées Orientales and Madrid respectively.

The *Ent. News* for December contains another of those remarkably close studies of the variation in the N. American Rhopalocera of which Mr. J. D. Gunder is the author. Although his methods are not quite along the lines of previous investigators of minor variations yet the abundance of illustration is a very great help to the understanding of his arguments and fixes their meaning much better than mere descriptions alone which may often be misread and misunderstood.

In the same number Prof. Cockerell describes and figures a remarkable new fossil Dragonfly from the Eocene of Colorado. There is an article by W. L. McAtee on "Verbose descriptions of Insects" which is well worth reading and thinking over. He says "There is nothing more wearisome and unprofitable than reading long-winded descriptions of insect species which include characters common to the genus, family or order and among which it is impossible to discover contrasting passages without the most careful comparison." We would add that the most modern classical example of such is that awful volume of the *Lepidoptera Phalaenae* issued by the British Museum; over 600 pages filled from cover to cover with descriptions without a contrasting passage. The description of each so called species is made as if no other like creature existed in the whole world. It is a help to no one except the man who has the actual object described in front of him and he does not want it really if the insect has its label attached. Waste of public money and energy.

REVIEWS AND NOTICES OF BOOKS.

"DER FLUGAPPARAT DER KÄFER: VORBEDINGUNG, URSACHE UND VERLAUF SEINER RÜCKBILDUNG" VON DR. P. FELIX RÜSCHKAMP S. J. STUTTGART 1927. 88pp., 5 figs., 8pls., 64refs.—The regression of organs is a subject full of interesting problems to the student of evolution, and the appearance of this important treatise draws attention to the wealth of material available for such a study in the phenomenon of wing-reduction in beetles. The condition of the hindwings of beetles is not often considered a matter of interest to the systematist, hence the amount of accurate information regarding their structure is

relatively small. Dr. Rüschkamp has however amassed considerable data on this subject, and it is satisfactory to find that he has not limited his studies to the examination of dead specimens, but has made careful observations on the flight capacity of many species. Since his knowledge and personal experience of beetles in their natural surroundings are evidently wide, and his acquaintance with the literature on wing reduction is extensive, the conclusions which he arrives at are certain to be of interest to entomologists. The author divides his work into two parts, the first dealing with the morphology of the flight-apparatus in beetles capable and incapable of flight, the second devoted mainly to theoretical considerations regarding the reduction of the flight-apparatus.

For his study of the flight apparatus of beetles able to fly, Dr. Rüschkamp selects the Brazilian Cerambycid, *Macropus longimanus*. The structure of the metathorax and the hindwings of this species is described in detail and the articulation of the wing is fully dealt with. The topography of the muscles of flight is described, and the author explains his views on the mechanism of flight.

The Chrysomelini are chosen by the author for his investigations of the reduction of the organs of flight. In this group transitional forms are to be found between beetles capable of flight, such as *Leptinotarsa decemlineata*, the Colorado potato beetle, and completely apterous forms as in the genus *Timarcha*. Some 700 examples of Chrysomelini have been examined by the author and the results of his observations on the wing-condition of 17 genera are briefly enumerated. In the genus *Chrysomela* alone the wing rudiments of 58 species have been studied and 86 figures of the wings are given. A great variation in the wings in individual species is recorded, but with increasing wing-reduction it was found that there was a tendency towards restriction of variation leading to relatively constant specific forms. The author considers that his many preparations of *Chrysomela* wings form an ideal series showing a gradually increasing rudimentation of the wing. In his opinion the occurrence, in a phylogenetically uniform group, of wings showing every grade of rudimentation, indicates that the most reduced wings have, in the course of regression, passed through all the transitional forms exhibited in such a series. So firmly is he convinced that wing-reduction has been acquired in this gradual way, that he considers it extremely doubtful that in one and the same species a non-sexual dimorphism of apterous and macropterous forms, forms capable of flight and incapable of flight, can exist without the presence of every intermediate form. Yet quite a number of instances of wing dimorphism are known in Coleoptera, especially in the genus *Longitarsus* and in the *Trichopterygidae*. Rüschkamp however doubts the occurrence of a true dimorphism in the latter family, since he states that the wings of the actual flying *Trichopterygidae* are much longer than those of the macropterous forms of *Ptinella* (one of the genera containing dimorphic species) and he considers that one is concerned here merely with brachypterous, micropterous and perhaps apterous specimens. Such an argument cannot apply to the case of *Sitona hispidula* in which the species exists in two well-marked forms, one having perfectly developed wings and the other short truncated wings of remarkably constant shape; moreover many

of the macropterous examples of this species possess fully developed wing-muscles and are capable of flight.

Rüschkamp's observations on the flight musculature of beetles incapable of flight are very interesting. He draws attention to the little known fact that the presence of fully developed hind-wings in a beetle does not always coincide with capacity to fly, and, according to his experience, the macropterous examples of the genus *Chrysomela* which he has studied, are incapable of flight. He has made anatomical investigations of the flight musculature of some 250 *Melasoma*, *Chrysomela* and *Chrysochloa* and the results of his observations are briefly recorded. He draws attention to the variation occurring in the condition of the muscles of flight during the life of the individual. Thus in freshly emerged *Chrysomela* he finds that the flight musculature has not reached its full height of development. The height of development of the flight musculature adjusts itself to the degree of wing-reduction, and in macropterous and slightly brachypterous *Chrysomela* the flight musculature, when fully developed, serves no longer for flight. Dr. Rüschkamp observed that the muscles of flight underwent histolysis in the course of the imaginal life, but it is to be regretted that he gives no detailed account of the histology of these muscles either at their height of development or after degeneration has set in.

Dr. Rüschkamp gives a full account of the structural modifications of the metathorax and elytra of various Chrysomelini in relation to incapacity for flight, and it is shown that many morphological modifications manifest themselves with the degeneration of the flight apparatus. The genera *Chrysochloa*, *Chrysomela* and *Timarcha* form morphologically a continuous chain, so that one can speak of an increasing Timarchisation, whereby the elongated, macropterous, orinoid forms become broad, oval and thickset Timarchid forms. The increasing Timarchisation is correlated with increasing degeneracy of the flight apparatus. (*To be concluded*).—Miss D.J.J.

INSECT SINGERS, A NATURAL HISTORY OF THE CICADAS, by J. G. Myers, D.Sc., M.Sc., F.E.S., with 7 plates and 116 figs. 320 pp., 21 s. Messrs. George Routledge and Sons, Ltd.—This is one of those wonderful books of modern times, in which the details of descriptive work and of biological observation are interwoven with classical, mediaeval and modern literature, art, mythology and folklore, in such a way as to interest both the scientific and the general reader. The vast number of extracts, quoted from writers of the past 2,000 years, must have entailed an enormous amount of reading and research. The author has done for the solitary Cicada what Wheeler has done for the Ant.

In the Introductory Chapter the author recalls us to the fact that the Hemiptera, the "bugs" as they are vulgarly termed, constitute a family "restricted by their make-up to a liquid diet, but adapted in a thousand ways to exploit every form of liquid refreshment, from plant sap to animal blood, which Nature affords." He further remarks that the cicadas "are the élite of this bibulous assemblage." "Art and alcohol have never been incongruous terms. It will therefore not surprise us to find that the greatest musical artists of the insect world are among its deepest drinkers."

Chapters II. and III. deal with the Cicada as portrayed in Mythology, Art and Literature, first in the classical and mediaeval writings of the western world and then in those of the eastern, and with it the artistic representations, which have been made of the Cicada, particularly in China and Japan. These chapters are succeeded by others on the External Structure, the Internal Structure and a most important summary of all that is known as to the Sound Organs of these Insects. Chapter VII. treats of the Classification, historically, as well as giving the results of the latest systematic work. The next chapter concerns the Evolution of the Cicada and needless to say that nought could have been written without full consideration being given to the classical work of both Handlirsch and Tillyard.

Chapters IX. and X. discuss the life-history of the Cicads; "the subterranean habits of the nymphs and the difficulty of keeping them in captivity, coupled with the usually long and sometimes phenomenally extended life-cycle render the rearing of isolated individuals from the egg to adult almost an impossibility." We feel sure that with the wonderful terrarium invented and used with such phenomenal success, by Hugh Main, B.Sc., F.E.S., the above extract will ere long be a superfluous and unnecessary comment, and the now hidden metamorphoses will be almost as easily followed as those of insects with above-ground metamorphological habits. Sections of the Life-history are separately considered. Mating, as noted from the time of Aristotle to that of Gadeau de Kerville; Maturation of Germ-cells; Spermatogenesis; Oogenesis; Oviposition, in considerable detail; Hatching; Nymphal Stages and Ecdysis; Seasonal and Cyclical Appearance; Sleep and Death: "When one walks along the outskirts of woods as early as the month of October, in the South of France, one finds the soil covered with dead Cicadas" (Figuier). "How quickly the end will come,—how speedily all must die."

Chap. XI: Geographical Distribution. Chapters XII. to XVII. show forth the general relations of Cicadas with other organisms; let it be said of the imaginal existence "*La vie est brève: Un peu d'amour, Un peu de rêve, Et puis bonjour.*" Cicadas and Lower Plants; Symbiotic and Micro-organisms; Cicadas and Vascular Plants; Feeding Habits of Cicadas; Relations with other Invertebrates, with Vertebrates (Bird Enemies, under which we have six pages of well authenticated records), and with Man (Aesthetic, Gastronomic, Medicinal, Injurious—sucking of sap and oviposition,—Transmission of Disease, etc.) Cicad Psychology is the Subject of Chapters XVIII. and XIX. "All instincts centre about alimentation and reproduction," says Wheeler. The Sensations; visual, auditory, tactile, olfactory. Animal Behaviour, both of the Nymph and of the adult. Chapter XX., Cicada Song, is almost wholly the work of the author's wife "who has adapted and practised a method of recording the songs of Cicadas" with remarkable success; a chapter of unique interest in a work such as this. The volume ends with a Bibliography of some 50 pages and an adequate Index. There are over a hundred diagrams and figures; the book is admirably paragraphed and headed; and so arranged that it is easy to consult, in fact the get up is everything that one could wish.—Hx.J.T.

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The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. May 23rd. June 13th.—Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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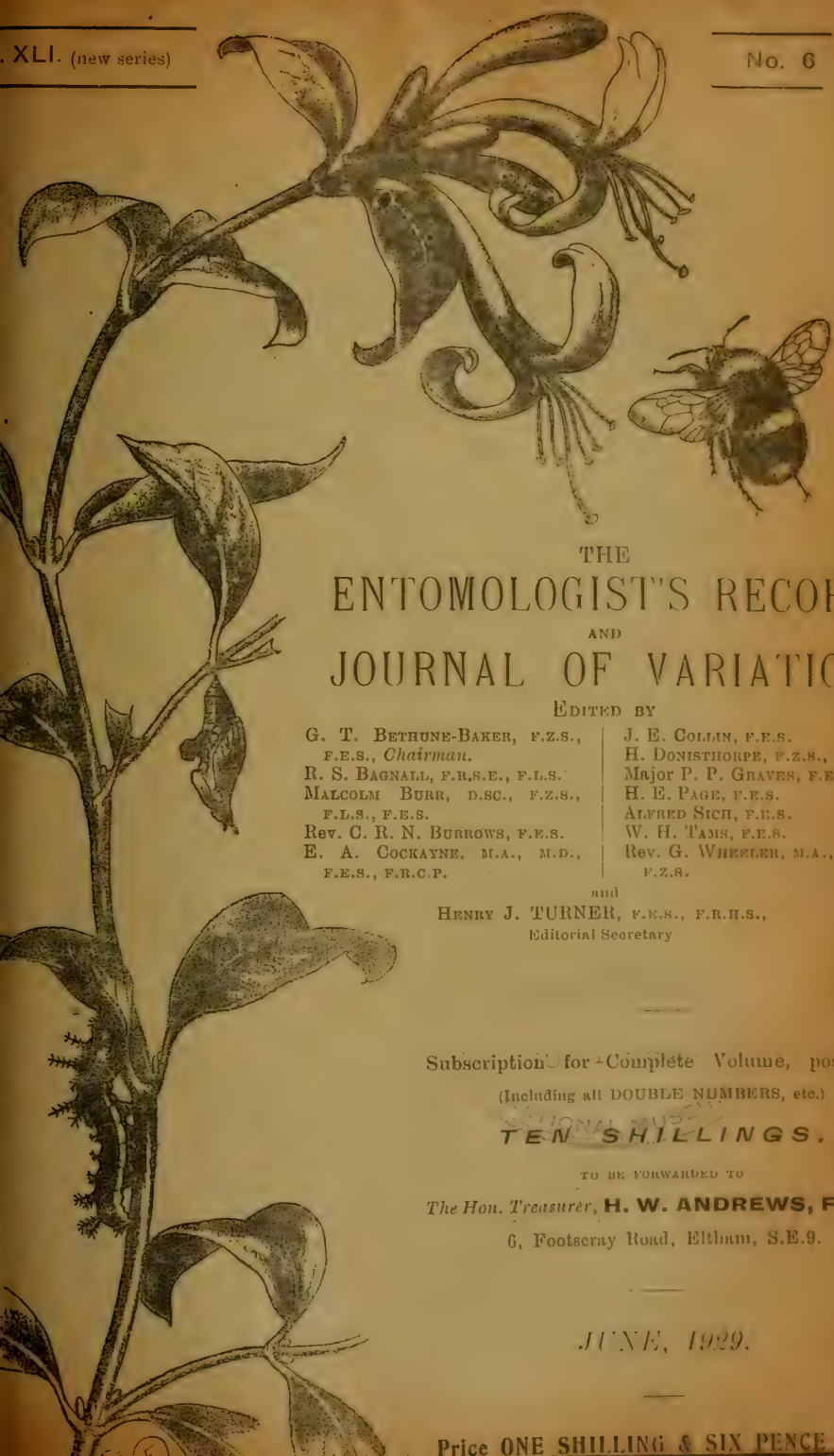
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Some Noctuae Varieties in 1928.

By A. J. WIGHTMAN, F.E.S.

The year 1928 must, on the whole I think, be considered as having been a favourable one for the field entomologist and was remarkable for the immense immigration of a number of species not usually to be met with in this country, except in small numbers, and then only in favourable seasons.

Sugar, which for the greater part of the summer was largely a failure, proved, in the autumn, to be a far greater attraction than the natural sweets, ivy bloom, yewberries and bramble-berries. I have never seen such numbers of *Scopelosoma satellitia*, *Orrhodia vaccinii*, *O. ligula*, *Amathes macilenta*, and *A. circellaris* as were attracted to sugared twigs and leaves during September, October and early November. While such species as *Agrotis saucia*, *Xylina socia*, and *X. ornithopus* were quite plentiful; *X. semibrunnea* was in sufficient numbers to make an evening at sugar without its appearance the exception rather than the rule. My list of Noctuae observed in Sussex during the year is the same as that for 1927 (*Ent. Record* Vol. XXXIX. pages 21 and 22 to the word *flavicornis* in line 6), with the exception of *Hadena genistae*, *Luperina cespitis*, *Leucania obsoleta* and *Palimpestis octogesima*, which species I did not meet with in 1928, and the addition of the true *Nonagria neurica*, Hb., *N. dissoluta*, Tr., and form *arundineta*, Schmidt., *Eumichtis protea* and *Heliothis peltigera*, taken in 1928, but not in 1927.

Outside the county of Sussex I was able to do very little collecting, but, through the kindness of a Hants collector, I was enabled to take the larvae of *Leucania turca* in the spring and the finest Noctua variety, which I bred during the season, was among the resultant imagines.

In the following notes on the forms obtained, I have not confined myself to this year's specimens in the cases of *Xanthia aurago* and *Aporophyla lutulenta*: the forms mentioned there having been obtained by breeding during the last three or four years.

Aporophyla lutulenta, Bkh.—From a number of larvae taken on, or near, the same spot as those, which in 1927 produced the fine grey forms, recorded *Ent. Record*, Vol. XXXIX., page 24, I failed to breed a single grey specimen and very few of the unicolorous forms. Instead I have a form which is new to me and is in some ways intermediate between the unicolorous black-brown and pale ashy-grey forms; a description of this form follows below, No. 3.

In my 1927 notes I was bold enough to use the names *lünburgensis*, Fr., *consimilis*, Steph., and *sedii*, Gn., but I have since been advised that my palest grey forms are certainly much paler than *sedii*, Gn., and that moreover there is no sort of agreement between the forms, for which Tutt used these names, *Brit. Noct.* and *rars.* Vol. III. pages 56 and 57, and the forms to which these names are applied by Warr. Seitz, *Pal. Noct.* III. [See appended note.—H.J.T., p. 88.]

In West Sussex the following forms occur; the percentage of any given form varying in different years. All these forms are bred specimens.

1. Unicolorous blackish brown almost the colour of *A. nigra*.
2. Unicolorous deep smoky brown.

3. Inner and outer areas deep smoky brown : central area slightly darker ; inner, outer and submarginal lines lost in ground colour, but they are edged in brownish ochreous, so that these transverse lines appear pale ; reniform or orbicular stigmata outlined in brownish ochreous and paler than ground colour ; a white line on the outer edge of the reniform ; two black ochreous edged dashes on the costa exactly above the reniform and another also edged with ochreous at the spot where the inner line reaches the costa. This form therefore belongs to the dark forms, yet is clearly marked.

4. Mouse grey ; transverse lines lost in ground colour but edged with ochreous so that transverse lines appear pale.

5. Deep ashy grey ; central area darker ; transverse lines darker than ground colour ; the inner and outer lines edged with paler grey ; stigmata paler grey than rest of central area.

6. Pale ashy-grey dusted with dark grey-atoms ; central area almost black ; inner and outer lines dark but edged with pale grey ; submarginal line dark grey.

7. As No. 6 above, but central area little darker than rest of wing ; central shade in dark brown stands out clearly on pale ground colour.

In all the above forms the hindwings of the males are almost white and those of the females dark grey. None of the above forms agree with specimens I have from Hoy taken in 1895 by McArthur. These latter may be compared with No. 6, above, by saying that the dark areas are darker and the pale areas paler in these Hoy insects in spite of them being over 30 years old. When fresh they must have been very different, in fact I imagine they belong to the form Tutt described as *albidilinea*, *Brit. Noct. and vars.* Vol. III. page 58.

Hydraecia micacea, Esp.—In a damp meadow, where for six months of the year the ground is sodden and often under water, I found a large patch of dead dock and each evening from early August to mid September several specimens of this insect could be found just at dusk drying their wings on the dock stems or surrounding herbage. A rather large percentage were cripples and some were exceedingly small. The variation in size was in fact remarkable ; the largest being 45mm. in expanse, the smallest 28mm.

As noted by Tutt the species varies greatly and some of the forms are very beautiful. They lose scales easily and specimens taken at sugar or light are but poor creatures when compared with bred specimens. The forms obtained are *grisea*, Tt. (one), *lutea*, Tt. (few), *cyprica*, Haw., *rubida*, Tt., *brunnea*, Tt., and the typical form. Some of the form *brunnea*, Tt., are very extreme, the anterior wings having the colour of typical *H. petasitis* and the posterior wings dull leaden grey too dark to show any distinct markings. I also took one specimen, which has the pale area between the outer line and submarginal line, clear pale pink, the submarginal band, inner and basal areas being darker than usual and deep purple red in colour. The left wing of fig. 8, plate 143, Vol. I. South's *Moths of the British Isles*, give some idea of this specimen, but the contrast in my specimen is very much greater.

Nonagria neurica, Hb.—Owing to a fire having destroyed a great part of the best known locality for this so scarce and local species, it has not been deemed advisable to take any number of larvae for several years, but a few have been taken, bred and paired and the resultant

ova returned to the reed bed when about to hatch in the Spring, and from this somewhat unsatisfactory (because so small in number) examination of forms occurring, it would seem that the percentage of dark fuscous and black forms is greatly increased since 1908, in which year the species was first found in Britain with certainty. This year of 5 insects bred only one was the type form, the other 4 being very dark or black*.

N. dissoluta, Fr.—A number of larvae taken in Eastbourne produced both the black type form and form *arundineta*, Schmidt. The colony from which these larvae came was established from East Kent specimens some years ago. We do not get the type form in West Sussex. All our native Sussex specimens being form *arundineta*, Schmidt.

N. sparganii, Esp.—This species was exceeding plentiful in Sussex this year, but the only form of special interest was a very large ♂, the ground colour of which is rich coppery red.

N. typhae, Thnbg.—I bred some 300 specimens of this species from a large pond returning the moths not wanted each evening. The forms obtained vary from the pale greyish type form through several shades of ochreous and pale red with brownish tinge to a deep red brown form, no doubt referable to *fraterna*, Fr., but the darkest is much less dark than the palest of the form *fraterna*, F., bred in 1927 from Norfolk pupae. *Ent. Rec.* Vol. XXXIX, page 23.

Xanthia aurago, Fab.—In addition to the type form, forms *rutilago*, Fab., *virgata*, Tt., and *fucata*, Esp., occurred. I have never taken forms *unicolor*, Tt. and *lutea*, Tt.; they must be very much alike, both are nearly unicolorous, and have pale orange ground colour. No doubt *lutea* is paler and more unicolorous than *unicolor*, but in a species which has so many shades of ground colour as this, it would be hard to draw the line of distinction.

The number of distinct looking forms, which this species produces, is remarkable; the colour of the central areas varies from pale lemon-yellow through several shades of deeper yellow, saffron, and orange, to deep carmine, and each shade except the palest and darkest has two rather different looking forms; the first in which the ground colour is unicolorous and smooth looking, the second in which the colour is obviously produced by one shade of yellow being thickly dusted with scales of a deeper shade giving the insect a much rougher appearance.

The colour of the dark inner and outer bands also varies from pale salmon pink with a bloom through deeper shades of pink, pale red, purple red, bluish purple with bloom to deep carmine red and blue-black with purple tinge. Almost any combination of colours may occur, but in my experience the central area is always paler than, or concolorous with, the inner and outer bands.

Tutt *Brit. Noct. and vars.* Vol. III., page 13, gives three not quite identical descriptions of the form *fucata*, Esp. My specimens agree with Tutt's description of Esper's figure rather than with his own description of the form, or that of Guenée, which he quotes. In West Sussex it is a very scarce form although the species is extremely abundant.

Scopelosoma satellitia.—When taking or breeding large numbers of this species, I always fancy I am obtaining quite a number of distinct looking forms, only to find when I come to examine the specimens

* I think the dark *neurica* is ab. *fusca*, Edel.—E. A. COCKAYNE.

closely that the differences are much less than I supposed. Of some 200-300 examined this autumn, I was only able to claim 3 as being worth special notice.

1. Dark slate-grey; reniform stigma yellow in colour; area between outer line and submarginal line pale whitish-ochreous.

2. Rich clear-red; ground colour of whole wing (anterior) unicolorous; transverse lines in darker red.

3. Reddish ochreous; basal and central areas much clouded with darker red.

Forms with red, white or yellow stigmata appeared to be in about equal proportion.

(To be concluded.)

[I have looked up the matter of *luneburgensis*, and gone over closely what Tutt did, *Brit. Noct.* III., 56, etc., with Freyer, Her-Schäff, Warr-Seitz, etc., before me, and I must agree with his determinations. Staudinger, had imperfectly identified specimens before him and could not have consulted Freyer's volume and figure, or he would not have said "nigricans, fasciis distinct. albis" (1871) altered to "al. ant. distincta albolineatis," (1901), *i.e.*, "forewings clearly marked with white lines," when Freyer's description read "anterior wings glossy black, with a very slight purplish tinge, the basal, elbowed and subterminal lines darker, an angulated, narrow, central shade very dark and quite black. Hindwings white, with dark nervures and a row of dots on the nervures." Warr.-Seitz says "*luneburgensis* is purplish grey with all the lines and stigmata very neatly marked and edged with paler; the median area darker; a decidedly smaller and neater insect than the type. (This description is made from a specimen in the Freyer collection marked by himself)" (p. 123). Tutt, and I think he was quite correct, even with the subsequent evidence of Warr.-Seitz, took the very definite words "glossy black" to mean what they purport and not "grey" as Freyer's specimen *now* is said to be. I have one of the Sligo forms and as Tutt says, "Freyer's description of *luneburgensis* is an excellent one of this Irish form." Percy Russ wrote of it, "the dark form almost as black as *E. nigra*, but with the central bar clearly visible in certain lights." Freyer's specimen now "grey," probably was black in its pristine glory; we must aver that Warr.-Seitz is in error, even with the specimen before him, in face of Freyer's *very definite* wording, "anterior wings *glossy black*." Also Warr.-Seitz remarks on *sedi, viz.*, that Tutt's interpretation of the latter is that of *luneburgensis* of Freyer is consequentially in error. How is it possible to confuse two insects so definitely diagnosed, the one "glossy black" and the other "ashy-grey." The whole thing is that authorities did not refer to the original but like Staudinger (who has been extensively relied on and followed) refrained from consulting the original definite descriptions.—H.J.T.]

The Asiatic origins of the Western Palaearctic Rhopalocera exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

(Continued from page 76.)

We now come to some handsome races of the Alpine region, which by their general aspect and by their principal features obviously would belong to the *caucasica-graeca-subpatygosana* kind of forms of the Central exerge. We are, however, obliged to classify them here, because they exhibit some characteristics, which betray a strain from the Northern exerge. It is remarkable that only a few miles north of Intra, up the Ossola Valley, there should exist a totally different race from *igneae*. The fact there should be no apparent difference in the surroundings, such as to explain a change of this sort in the aspect of *didyma*, strengthens one's belief these two races must have originated from two exerges, which have overlapped in that region, as their aspects seem to suggest. Thus we can consider that race, named *TARLONIA*, Frbst., as an offshoot of the *caucasica* group of races of the Central exerge, to which are due its large size and broad wings, whilst its remarkably rich colouring on both surfaces, of a reddish fulvous with broad black spots has been presumably introduced in it by crossings with *igneae*; at Crevola, on the southern watershed of the Simplon, out of ten females, Frühstorfer has found none with blackish or greenish dusting; in the damper Anzasca side-valley, at Vanzone, 700 m., I have found 50% with a slight partial dusting of greenish-grey on the forewing, but only 2% were dark enough to be called *alpina*. Its author states that *tarlonia* is found also in hot localities of the Valais and the Jura (Neuveville, Bieler Lake, Valley of Mesocco, at 600-700m.).

At high altitudes in that region the dark *alpina* form of the female becomes predominant, mixed with transitions to *ravalpina*, which I will describe below and which is, on the contrary, the more usual one in S. Tyrol. The difference between the Valais form and the latter can be seen by comparing Seitz's figure of *alpina*, on pl. 66. with Spüler's I am about to quote. The former is more heavily loaded with large black spots, partly confluent in the submarginal area, and with a more or less extensive central suffusion of decidedly black scaling, so that it looks patched with black; the male differs from that of *ravalpina* in the same way as the one of *tarlonia* differs from *naiina*. I name this race **atralpina**.

The nearest ally of *tarlonia*, race *NAÏNA*, Frbst., of the low, hot valleys of S. Tyrol, belongs still more distinctly than the former to the southern exerge by its still larger size, broader wings, clearer, vivid, fulvous and smaller black spotting, but, on the other hand, the tone of the fulvous on the underside is so reddish and the ground colour is so white in most individuals, that the influence of the nominotypical exerge from the north could scarcely have been doubted, even if it were not proved by some small females mixed in my series from Klausen, which are in every way identical with some of those from Central Germany.

I possess a corresponding race of high altitudes from the upper Schnalsertal, in which the size is smaller (although still much larger than *rectealpina*) and the males differ in no other way from *naiina*, but the females are all more or less broadly darkened by an even suffusion

of a usually clear greenish grey, exceptionally in some cases quite smoky, as in *atralpina*, which in the darkest one only leaves a small pale fulvous space near the costa of hindwing uncovered; this even dusting over the whole ground-colour has a very different look from the blacker, but more broken darkening of true *alpina*, Stdgr., such as one finds in race *rectealpina*, and to a certain extent in *atralpina*, which rises along the nervures and leaves clear spaces of white ground-colour, between them, in the outer half of the wings, as figured by Herrich-Schäffer. I insist on this difference, because the race I am describing here is the one which is often considered highly characteristic of *alpina*, Stdgr., whereas it appears to me this is not correct and one should distinguish it by the special name of **ravalpina** (*rarus*=greyish). Spüler's figures of *didyma*, pl. 7, fig. 17, give a fair idea of both sexes, although the grey of the female is rarely quite as even and is often darker.

Frühstorfer compares his *LESORA*, of Laibach in Carniola, to *talonia*, from which one gathers it differs chiefly by its extremely bold black spotting and broad marginal band, often confluent. He expresses some surprise at the great difference between this race and *oreithya*, which flies so close to it, on the coast, but one can understand it perfectly in the sense that *lesora* has received a much greater strain from nominotypical *didyma*; the latter, I know, is as far as Styria exactly like the German one.

Race *OREITHYIA*, Frbst., of Trieste (cotypes of June and July from Fucine), on the contrary, should nearly be classified amongst the races of the Central exerge, because the *didyma* strain in it is slight: it is visible chiefly in the male sex, where some individuals are quite like it, whereas others actually vary as far as the *romana* degree of reduced pattern and light yellowish fulvous on both surfaces. On the whole, I should describe it as standing between *naïna* and *subpatycosana*, Vrty., of Central Italy, but exhibiting in the female a different look, from both on account of the very pale, dull ochreous ground colour, shading frequently into whitish areas; also the male is less vivid and in both sexes the average extent of the black markings is a little greater, although in extreme examples, as I have just stated, they become very minute. I have collected its II. gen. at the beginning of September at Portorose in Istria and amongst my specimens are some exactly similar to those figured by Stauder in the *Zeit. wissenschaft. Insektenbiol.*, XVII, pl. I (1922), which at p. 60 he calls *dalmatina* and *persea*. It is high time one should put a stop to this use of names in totally incorrect ways. The first was given by Staudinger in his 1861 edition to Herrich-Schäffer's figure 131, from a specimen of Ragusa in Dalmatia, so that its meaning is perfectly definite and it applies to the tiny II. gen. with a pale ochreous ground-colour and minute spotting, but marginal streak quite continuous, though very thin, which Culot has renamed *bosphorana* from Constantinople and Turati *roccii* from Genoa, and which is quite racial in some localities. Riley has already dealt with *persea*, showing Kirby and Rühl had been right in attributing it to the Persian race of *trivia*, Schiff. I note, however, that Staudinger had done so too in the 1861 edition of his Catalogue and that he transferred it to *didyma* in the 1871 edition, with the words: "secundum specim. typ." I leave it at this because it has no importance here, where the Persian *didyma* whatever its name is to be,

is never found, just as it is never found anywhere else in Europe. Stauder's figure 8 represents a male form similar to *marsilia*, Frhst., with small black markings, which is frequent at Trieste and in Istria; the *caldaria*, Vrtý., female form of fig. 9 is scarcer, that sex usually having a bolder spotting, and the one of fig. 10 of an extreme *caldaria* is quite an aberration in that locality. On the whole the II. generation can be described as nearly identical with *marsilia*, with a mixture of *caldaria*, especially in the male sex, but differing from them by its larger size and by the same characteristic pale, dull tone of fulvous as in the I. gen. *oreithya*, which in some females actually becomes dirty white (the name of *subalbida*, Schultz, does not apply at all to the latter, its having been given to an alpine aberration from the Valais). The II gen. can be designated as **postoreithya**.

Race DRUENTIA, Frhst., described from the Maklen Pass and Coricna in Bosnia and which had struck Rebel as very peculiar from Jablanica in Herzegovina, differs from all the other known races by the "deep reddish brown" colour of its male and also exhibits a remarkably massive black pattern in both sexes, whilst some extreme females are entirely covered by a dark greenish black suffusion. I take it to be the alpine race of the northern Balkans, analogous to *apenninigena*, Vrtý., of Central Italy, but with a strong admixture of the northern exerge, which has accentuated the black pattern still more and may have introduced the deep fulvous feature, although the latter exists also in some males of *græca* and of *patygosana*.

(To be continued.)

Larval Descriptions from the Argentine.

By CAPT. K. J. HAYWARD, F.E.S., F.R.G.S.

A SHORT DESCRIPTION OF THE LARVA OF MAENAS AZOLLAE, BERG.

Whilst duck shooting at La Gallareta, Prov. of Santa Fé, I had occasion to cross a large sheet of shallow water completely covered with a small-leaved water-weed that covers the water so closely as to resemble a close cut lawn. I noted several caterpillars struggling in the water where I had parted the weed, and at first thought they had fallen from some tall grasses growing nearby, but later finding them everywhere on this weed, often a considerable distance from shore, I realised that they were feeding. I collected several specimens that appeared full fed (as I should have no opportunity of obtaining food for them during the following days), and was lucky enough to get a few through. I made the short note of their appearance which follows.

Length apparently variable, the largest noted being 64mm. A thick tuft of short hairs on the dorsal portion of each segment and a series of smaller tufts on the marginal line. These hairs are velvet black except along the centre of the dorsum where they are light velvet brown shading to pale brown, almost white, at the tops. In some specimens this line of lighter hairs did not extend beyond the 5th or 6th abdominal segment. A considerable number of longer black hairs projected from all these tufts. The head, underside, and legs black.

The larvae spun up in a small ovoid cocoon of a deep coffee brown, emerging in seventeen days.

Imagines sent to the British Museum under No. 7602 and empty cocoons and pupae under No. 7603.

DESCRIPTION OF THE LARVA AND PUPA OF *PACHYTILUS FICUS*, LINN.

Length 110mm. Greatest girth approximately 70mm.

Head black, glabrous. Face greenish grey.

The dorsal and upper lateral area light mahogany brown terminating on the 1st thoracic and penultimate segments in black wedge-shaped patches, that on the 1st thoracic straight frontally and curved backwards so as to form a segment of a circle, that on the penultimate segment slightly lunular with apex towards anus. Lower lateral area, anal segment, and underside, greenish grey. Spiracles black. A black triangular-shaped patch on either side of anal segment. A series of dark mahogany brown transverse rings on the thoracic and abdominal segments except the 10th abdominal, very irregular in thickness, eight in number on the abdominal segments, slightly fewer on the thoracic, terminating at the margin, broken to form a lateral line of the ground colour. A dark suffused spot dorsally in each fold. On the 8th abdominal segment a short black horn about 3mm. in length.

Found at Ocampo Prov. of Santa Fé, Argentine, on November 9th. Commenced to pupate on the 10th. Emerged December 6th between 8 p.m. and 9 p.m.

Food plant unknown, the larva found in the vicinity of vine and banana, but being then full fed may have travelled some distance before being picked up.

A heavy dark chocolate-brown pupa-obtecta, lighter on the wing cases, 67mm. in length. Pupa tapers from second abdominal segment to head, and anal end is rounded, somewhat blunt. Markings finely striate on thorax, punctate on abdominal segments. Subsegments well defined by slight ridges.

Imago sent to British Museum under number 7604, empty pupa case under number 7605.

DESCRIPTION OF LARVA AND PUPA OF *HERSE CINGULATA*, FABR.

Length 110mm.

Colour dull bluish green, darker on the head and beneath with faint indication of some lighter speckling.

On the first seven abdominal segments a white diagonal stripe running back from the margin, but very cloudy and ill-defined, without any edging and merging into the ground colour. On the seventh segment this stripe continues back on to the eighth segment to the base of the horn.

Horn dirty white. Spiracles light reddish brown on a whitish patch which is indistinct and suffused greenish. Forelegs dirty white with some indication of black ringings.

This larva pupated the day following receipt, and whether the colours are better defined and brighter whilst feeding is taking place, I cannot say. The larva had the appearance of having faded.

Described from a single larva sent me from Villa Ocampo, Province of Santa Fé, Argentine, on November 19th, 1928.

Foodplant not identified. I fed it on vine which it immediately began to chew, not along the edges, but in patches on the face of the leaf, but I feel that the insect was simply trying to accumulate material in which to bury, as it did not appear to do more than cut the leaf up into small bits. It ceased this operation and went down immediately I gave it material in which to pupate.

Pupated November 20th. Emerged between 9 p.m. and 10.30 p.m. December 11th.

Pupa-obtecta 54mm. long, chestnut brown, tongue case free $\frac{1}{4}$, final $\frac{1}{3}$ doubled back and fastened to the pupa by its upper edge, thus forming a large loop. Metathorax with punctate callosities.

Imago sent to the British Museum under number 7606 empty pupa case under number 7607.

(To be continued.)

New Forms of Lepidoptera.

Under the above heading we intend from time to time to note the new forms of British Lepidoptera, which are announced in the various magazines which come to our table, and also of the Palaearctic Rhopalocera in which so many of our correspondents are particularly interested.

In *Lamb.* for December, M. Van. Mellaerts describes (1) ab. *obscura* of *Craniophora ligustri*, in which the fore-wings, prothorax and abdomen are black with typical greenish markings. The hindwings are pale black. It will be noted that the ab. *nigra*, Tutt is wholly black. (2) ab. *semialbata* of *Lomaspilis marginata* in which the marginal band of the forewings is obsolete and the hindwings immaculate white.

M. F. Braun announces, *l.c.*, two new aberrations of *Colias croceus* (1) ab. *fischerii*, in which the discoidal spot of the forewings below is ocellated; a frequent occurrence; (2) ab. *flavomaculata* of ♀ *helice*, in which the discoidal spot of the hindwings is slightly tinged with yellow.

In *Lamb.* for November appears a description of a further aberration of *Pieris napi* ♀ in which the two large spots on the forewings are united by a "large et bien marqué" character, which is produced to unite with the apical blotch. M. Cabeau has named it ab. *interjuncta*. It was captured at Lembecq in Belgium. The author points out that in ♀ ab. *confluens*, Schima, the anteapical extension is absent, and in a note ab. *confluens*, Schima (1910)=? ab. *confluens*, Lhomme (1923)=? ab. ♀ *semifasciata*, Cabeau (1924).

In the same number Dr. Mezgar announces and describes three new aberrations of *Samia cynthia* in addition to the ab. *viridis* which he described in June, 1928. (1) ab. *bicolorata*, variegated with yellow and green; (2) ab. *punctata*, by the altered position of the band, a small space is formed, almost round and of a dull green almost black, giving the impression of a large dot; (3) ab. *fenestrella*, the white line is effaced for some distance where it touches the band.

In the January no. *l.c.*, M. Culot describes ab. ♀ *maricolore* of *Ematurga atomaria*, in which the ground colour is of an intense fulvous coloration even more pronounced than in the extreme yellow males.

In the February no. *l.c.*, M. F. Derenne, announces ab. ♀ *sabulosa* of *Diacrisia mendica*, in which the ♀ is large, the forewings of a sandy colour, while the hindwings remain of the typical milky-white.

In the *Ent. Zeit.*, Feb. 8, 1929, S. G. Toll describes and figures a form of *Dicranura vinula* as race *tanaica*. It is distinguished by the forewings being pure white with all the usual markings either absent or only present as traces, the disc is particularly free from markings.

The hindwings are pale grey, only the inner margins being white. Head and antennae white. Thorax and abdomen rather more strongly marked with grey than in the typical male. The undersides are white with pale grey hairs on the disc and with grey traces on the margins between the veins. South-east of Russia in the Don basin.

Dr. Schawerda, in the *Zt. Oesterr. Ent. Ver.* for Dec., 1928, describes a new form of *Bryophila* (*Metachrostis*) *perla* from Corsica as var. *corsivola*. It is distinguished as being of pure white ground with black, almost blue-black, not grey, markings. Both the stigmata and the area just below the orbicular are deep black. The markings and ground are in strong contrast. The hindwings are broader and darker margined, and the underside of both wings is dark.

The same author describes a new form of *Agrotis* (*Euxoa*) *obelisca* from the same island, as var. *corsivola*. It is appreciably smaller, but above all is the striking colour, which is a deep grey brown, quite in contrast with the brown or red brown of the nominotypical form. The marking detail is also different.

Correction.

Coccinella hieroglyphica, L.—I regret there is an error in the spelling of the aberration No. 11 in my paper in *Ent. Rec.* XLI. 4, p. 62. The correct spelling should be "**sicardi**" (not sigardi), as I had the honour to name this after Dr. Sicard of St. Vivien par Velines, the well-known authority on Coccinellids, to whom I am much indebted for information and help.—G. C. LEMAN.

Observations on Iberian Rhopalocera.

By ORAZIO QUERCI.

After five years collecting in Andalusia, Aragon, Asturias, Castile, Catalonia and Portugal and with the help of the collections in the Museum of Biology of Barcelona and the Bocage Museum of Lisbon, I have written some notes concerning the 197 species of Butterflies and Skippers from the Iberian Peninsula. I am chiefly speaking about:—

I. The mode of emergence; quoting many data of long collecting, and giving the list of all the males and females of every species we daily found, in ten months of uninterrupted captures, in 1928, near Lisbon and in central Spain.

II. The annual variations which I have remarked comparing the lepidoptera from Serra da Estrela in the Bocage Museum, with those we found later in the same locality, and the specimens we took in the Montes Universales in 1924 and 1926 (when it never rained) with those from the same mass in 1928 (when it very often rained). With several species the prevailing form is different if the insects emerge either in a dry or wet year.

III. The greater variability in different Catalan surroundings, but the less striking annual variations, because in Catalonia the climate is more constant in the Ibero-African zone.

I have also made some observations when collecting in a country whence came the type specimens of a named subspecies and I found there that most individuals do not agree with the description of the presumed subspecies.

I have examined more than 120,000 Spanish and Portuguese butterflies and compared them with those of the nominotypical races from Sweden, Germany, Austria, Russia, etc., of which there are good series in the Barcelona Museum. In the Iberian Peninsula there are many peculiar subspecies, but some of the so-called races are but occasional forms. The number of generations, I have observed, are never more than three.

My book, of about 200 pages, will be published by the Museum of Natural Sciences of Barcelona.

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at Caracas, Ditton Hill on December 6th, 1928, Mr. W. J. Kaye in the chair. Members present in addition to the Chairman—Mr. H. Donisthorpe, Prof. E. B. Poulton, Mr. Jas. E. Collin and Dr. Harry Eltringham. Visitors present—Messrs. C. L. Colinette, F. L. Oldaker, H. Main, W. Rait Smith, Capt. N. D. Riley and Dr. Guy Marshall. The guests were received by Mr. and Mrs. Kaye and light refreshments were served in the drawing room. Mr. Kaye's collections of Lepidoptera were on view and were examined with great pleasure by the entomologists present. Two drawers of *Erycinidae* from Trinidad, containing nearly the whole of the 97 species recorded up-to-date, were of particular interest. Mr. H. Donisthorpe exhibited the ant *Mesosa nubila* carrying a predaceous larva of *Athous rhombens* (Coleoptera). Supper was served at 8 o'clock after which a business meeting of the Club was held. A very enjoyable evening was spent and the company dispersed at a late hour. It was reported during the business meeting that further additions have been made to the Entomological Club Trust Fund. The trustees of this fund are Mr. Robert Adkin, Mr. H. Willoughby Ellis and Mr. J. E. Collin, the latter acting as Hon. Treasurer, to whom donations may be sent.—H. WILLOUGHBY ELLIS.

Mr. L. E. Hope, F.L.S., Director of Tullie House, Carlisle, and Curator of the famous museum there has reached the age at which, according to red tape, he must retire. For 38 years Mr. Hope has been connected with the Carlisle Museum and under his able management it has become a famous institution, famed alike for its fine collections of Local Bird life and Roman and Celtic Antiquities. Many well known antiquarians and naturalists have visited the Museum and all speak of having received help and inspiration from its well-arranged collections and its able curator. As a naturalist Mr. Linneus E. Hope is a worthy follower of his great name-sake Linneus, and no one knows more of the Ornithology, General Zoology, Entomology, Botany and Geology of the Carlisle area than he does, in addition to this he is a regular encyclopedia of local history. He will be sadly missed and his place will be a very difficult one to fill. Rumour speaks of the local Council handing the Museum over to the care of the Librarian with a junior assistant, but one would hardly believe that Carlisle, priding itself, as it does, on its modernity and progress, would take such a very retrograde step. Were it to do so then indeed would the institution be left "Hopeless" for it would, as a protest, lose the help and support of many, who have helped Mr. Hope in his able efforts against lack of adequate space, lack of adequate funds, and a non-appreciation of its

true value, to bring the institution to its present well known excellence. Mr. Hope is a Fellow of the Linnean Society, a Vice-President of the Museums' Association, President of the Carlisle Natural History Society and of the local Literary and Scientific Society.—T.F.M.

The *Transactions of the Hampshire Entomological Society* for 1928 are not only interesting as the records of the doings of a very successful local society, but are useful as containing contributions of value in other orders besides that of the well-worked and still scientifically attractive Lepidoptera. Three members contribute notes on the Coleoptera, two on Hymenoptera, rather a longer one on the Diptera of Hampshire in 1928, by the Hon. Secretary, Mr. E. R. Goffe, and another on the Neuroptera of Hampshire, by the last Secretary, Mr. Killington, the last with a plate of ova of *Chrysopa*. We hope, later on, to have the Fauna of Hampshire in these two orders sent to our pages for publication. Of course there are valuable contributions from the pen of Mr. Fassnidge, who, besides his Notes on the Lepidoptera of Hampshire in 1928, gives notes on the very rare *Myelois cirrigerella*, which has only been taken on three occasions in this country, and on the Distribution of *Synanthedon flaviventris*. The reports of the General and Field Meetings contain many records and collecting notes. Rannock, we presume, means Rannoch. We note the success of the Treasurer in so ordering the finances that each year there is a sufficient balance to pay the printer's bill for the Transactions and that with only a small sum donated (this year not quite £5), and this on a membership of less than 60. The "good-fellowship" of which the society is proud is apparently real. Our congratulations to all concerned.

No. 2 of the Cambridge Fauna Lists issued by the Cambridge Natural History Society is to hand: *The Spiders of Cambridgeshire (Including Harvest-spiders and Pseudoscorpions)* by W. S. Bristowe, B.A., F.Z.S. The author, so well-known for his pursuit of these more or less neglected beasties, has done good work in this Local List, for is it not a mere list, but it contains notes on the literature, the scanty records, historical references, collecting grounds, a few lists of captures in the best county localities and remarks on the families and on many of the species to be met with. In 25 pages there is compressed a very considerable amount of interesting and useful information. We note that the poor printer has scored again in getting in "Psuedo-scorpions" twice, once on the cover.

With Vol. XXI. of the *Boll. Lab. Zool. Gen. e Agraria* of Portici, Italy, is published a General Index to the whole of the previous issues, Vols. I.-XX. Such Indexes are of the greatest use and save much time and often weary searching to the busy worker. The present Vol. contain some thirteen memoirs quite adequately illustrated, most of them not merely summaries but records of original biological investigations upon all orders of insects by Prof. Silvestri, H. Priesner, W. M. Wheeler, G. S. Candura, etc. Especial studies are included of parasitic insects which may prove economically valuable.

The Agricultural Research Institute at Pusa, India, have sent out a valuable *Contribution to our Knowledge of the Thysanoptera of India*, consisting of 100 pp., with many figures and 2 plates, by T. V. Ramakrishna Ayyar, B.A., Ph.D., F.Z.S. There is a summary of the small amount of previous work which had been done in this order, an

account of the methods adopted, a general introduction to the Thysanoptera as a whole with especial reference to India, succeeded by chapters on the Distribution and Classification, followed by descriptions of the species discovered up to date.

The 3rd and 4th parts of the *Ann. Soc. ent. France* for 1928, contain among other matter contributions from (1) Abbé J. de Joannis on the Heterocera of Tonkin, with 2 plates. (2) R. Ferreira d'Almeida, further notes on the Rhopalocera of S. America. (3) B. Benoist, the Hymenopterous Fauna of the French Alps.

The first part of the *Bull. Hill Museum*, Vol. III., has just been issued. It contains about 100 pp. of descriptive matter with a plate, and 50 pages of the Revision of the *Phygadeuon* by A. Hall. It is a real pleasure to see that the descriptions are comparative and not the wretched ad hoc stuff that so many descriptive writers deluge us with. Every description we tested had at least one comparison, most of them several. All such enhance the use of the work done immensely. In the supplement we notice the old error as *P. teletusa teletusa*, Godt., which probably should be *P. teletusa*, Godt., *teletusa*. There is an important identity note on the American *Pieris* (*Belenois*) *monuste*, which, after much detailed research and with the agreement of that expert nomenclator L. B. Prout, must now be known as *phileta*, Fab. We trust that every Museum of note in the world subscribes to this valuable periodical.

REVIEWS AND NOTICES OF BOOKS.

"DER FLUGAPPARAT DER KÄFER: VORBEDINGUNG, URSACHE UND VERLAUF SEINER RÜCKBILDUNG" VON DR. P. FELIX RÜSCHKAMP, S. J. STUTTGART 1927. 88 *Zoologica*, Hft. 75, 5 figs., 8pls., 64 refs. (*Concluded from p. 83*).—In the second section of this treatise Dr. Rüschkamp discusses the preliminary condition and cause of reduction of the flight apparatus. In comparison with other orders of insects he points out that beetles are as a rule poor fliers and that the distribution of efficiency for flight in this order is extremely small. He discusses the importance of flight in regard to escape from danger, acquirement of food, and propagation of the species. He concludes that capacity and incapacity for flight are always the mirror image of the habits, which presuppose the use of wings or render them superfluous.

Dr. Rüschkamp gives an interesting discussion of the supposed effect of life in such habitats as islands, mountains and caves in inducing winglessness. He very rightly points out that not only in these localities are the species concerned unable to fly, but that they, or their nearest relatives, are to be found incapable of flight or wingless in their entire area of distribution, on islands and mountains, in caves and out of caves, and also in wind-sheltered spots in flat country. The significant percentage of flightless beetles occurring in islands, mountains and caves is sufficiently to be explained in the failure of groups containing predominantly flying species to live in such localities. The habitat as such can in no way induce the wingless condition.

The views of many writers on the regression of organs are discussed by Dr. Rüschkamp at considerable length. In his opinion the common and widespread incapacity for flight amongst beetles demands a uniform explanation. He considers that the essential condition for the reduction

of the wings has been a changed mode of life during the history of the race, and that, in consequence of this change of habit, the capacity for flight has lost its significance in the struggle for existence and so has been withdrawn from the influence of natural selection. Loss of function he believes is the condition responsible for, and increasingly arrested unfolding of the "Anlage" the cause of, retrogression. He is averse to the view that such regressive changes can have been produced by mutations. He considers that mutations affecting the organs of flight would have led to catastrophe and does not seem to have visualized the possibility that such mutations may have set in at a stage when, through changed habits, the power to fly was no longer of vital importance to the species. Dr. Rüschkamp discusses the possible value of natural selection in favouring the survival of flightless beetles. As he says it is not possible to conceive of natural selection bringing about a gradually increasing reduction of the wings unless one can show that each increasing grade of wing reduction, from slightly shortened macropterous wings to complete apterism, was of advantage to the species in the struggle for existence. He then considers the possibility that the flightless condition may be correlated with structural modifications of advantage to the species and that this may be the reason of the survival of such flightless forms. Thus apterism might be correlated with a raised fertility. He points out that physogastry is constantly connected with high fertility, but that incapacity for flight is more widely distributed amongst female beetles than physogastry; and physogastry and capacity for flight can exist side by side. The tendency to increased fertility can therefore not be looked upon as the cause, or the necessary consequence, of an increasing reduction of the flight apparatus. Dr. Rüschkamp also shows that there is no correlation existing between retrogression of the wings and a thickening and strengthening of the elytra and exoskeleton, since amongst beetles in which the exoskeletal parts are strongly developed many are capable of flight, and in fact some must be reckoned as first rate fliers. The author therefore concludes that selection fails as an explanation of the processes of rudimentation. In his opinion the essential condition controlling the retrogression of an organ is disuse. Between disuse and rudimentation he sees, however, only an indirect causal connection, and he believes that the cause of rudimentation (in his opinion the failure of the "Anlage" to develop) lies in the formation of growth arresting hormones or in the dying out of developing promoting hormones. He suggests that some kind of "chemismus" is connected with the use of the wings, and that this "chemismus" may issue from the wing muscles and overflow to the egg plasm, and in the following generation will provide for the renewed activities of the wing "Anlage." With the cessation of flight the hormone production will cease. He sees in the range of rudimentation from macropterism to apterism a constantly increasing inactivation (or arrest) of the unchanged wing "Anlage." Use he considers, on the other hand, works in a direction determining the development of an organ and this advancement must also rest on a "chemismus." Dr. Rüschkamp thus looks upon rudimentation merely as arrested development of the initial rudiment and he expresses the view that even in fully attained apterism the potentiality for the unfolding of the entire wing rudiment ("Flügelanlage") is still present.

I do not find it easy to understand Dr. Rüschkamp's views. Thus for instance it is not clear to me how he accounts for the increasing reduction of an organ after the initial suspension of activity. If I understand his theory aright, once flight is entirely abandoned the hormone production will cease, yet according to his view failure to use the wing muscles is only the first stage leading to complete apterism. It is possible that he would explain the later stages of the rudimentation as due to the dying out of growth promoting hormones.

A theory of such purely speculative nature is not easy to refute, or to substantiate; the supposed hormones, if produced, remain invisible. Should however such growth arresting or growth promoting hormones actually be present, one would expect to see in the progeny of a long-winged and a short-winged insect a visible result of their interaction, a blending of the qualities of the parents. Yet it is usual to find that when long- and short-winged forms of the same species have been bred together these characters are inherited according to Mendelian laws, there is segregation but not blending of characters. In *Sitona hispidula* the F_1 individuals resulting from such a cross are brachypterous just like the short-winged parent, since this condition behaves as a simple Mendelian dominant. In *Bruchus quadrimaculatus* the apterous mutation observed by Breitenbecher was inherited as a Mendelian recessive only manifested in the females; the mutant character had retained its individuality. Moreover Dr. Rüschkamp's hypothesis fails to explain the occurrence of retrogressive mutations in *Drosophila*, as, according to him, morphological changes are effected with excessive slowness. Nor is his theory in keeping with the fact that winged females of ants and termites produce both winged and wingless offspring. Though Dr. Rüschkamp refers to the latter subject at some length I find his arguments difficult to follow. He again appeals to a possible hormone action, and states "Die auf die Entfaltung der Anlagen des Flug- (und Geschlechts-) Apparates hemmend einwirkenden Stoffe können nur auf trophobiontischem Wege beigebracht werden." Such an explanation seems to me very obscure.

Dr. Rüschkamp's theories, however interesting, do not appear to me very helpful; they are based on the assumption that apterism and the modifications associated with this condition have been produced in the course of time by a gradual reduction of the organs of flight, and for this assumption there is no proof. Much more requires to be known of the laws governing growth and form before we can conclude that use or disuse are responsible, through a supposed hormone action, for structural changes. One hopes that the interesting account which Dr. Rüschkamp gives of the reduction of the organs of flight in beetles will stimulate other workers to investigate this subject, but it is felt that light will be brought to bear on this problem not so much by the examination of the external characters of series of flightless beetles, as by studying the genetics of the flightless forms whenever this is possible, by investigating their ontogenetic development and by testing the effect of environmental conditions in inducing germinal variations.—(Miss) D. J. JACKSON, (F.E.S.)

ANTS, BEES AND WASPS, by Sir John Lubbock (Lord Avebury). New Edition based on the 17th. Edited and Annotated by J. G. Myers, D.Sc., F.E.S. Kegan Paul.—This contains the text of the famous Lubbock book without the Appendices of data, 248 pp. and a series of masterly Annotations bringing the various sections up to date with an adequate Bibliography, 120 pp. There is a short account also of Lubbock as an entomologist. 'Tis a pity the plates are new; the less said about them the better. The annotations really form a supplementary volume by an extremely well-informed and gifted scientist, J. G. Myers, whose practical work has given him the fundamental knowledge, to make the best use of the published literature on the subject, such as the works by Wheeler, Forel, Donisthorpe, etc., Since Lubbock's time great advance has been made in the study of insect behaviour, and many of the problems not then attempted have now been either solved, or brought nearer to solution. The writer begins by pointing out that Lubbock's claim, that ants rank next to man in the scale of intelligence, cannot stand in the light of our modern knowledge, and also that the present student does not now subscribe to the antiquated conception of instinct. Lubbock's estimated 1000 ant species now becomes 3500 listed species besides a large number of forms below the grade of species. Only one family instead of 3 is now recognised, divided into numerous sub-families. The various new forms of artificial observation nests for ants are described; the results obtained from the use of such afford a most entrancing note on the relation between ants and their larvae and the remarkably curious exchange of food known as "trophallaxis," a reciprocal feeding of nurses and larvae. The latest modern views on the various subjects touched on by Lubbock are tersely given. Longevity, Lubbock's record queen of 15 years is still unbeaten; the so-called big-headed "soldiers," not always now to be considered defenders; the baffling origin of castes, not yet solved but perhaps carried stages further; "ant-cows," the relation is now known to be truly symbiotic and in fact to control the ant-hosts may mean the control of the "cow"-pest as in the Canaries with the banana mealy-bug; "pseudogynes" or pathological adults, both Wheeler and Donisthorpe are quoted, the detailed observations of the latter not being in agreement with the views of Wheeler; Colony forming; Relations between flowers and ants, with a discussion on odour and vision; Harvesting habits, Cultivating seeds habit, many new facts and observations afforded; Mimicry, a very careful summary of modern views; Parasitic enemies of ants, many interesting notes, observations and new facts are contributed; Ants and caterpillars, since Lubbock's day extraordinary discoveries have been made on this relationship; Myrmecophiles, the vast amount of knowledge on this wonderful relationship, in which some 2000 species have now been described as taking part, is ably told: the Senses are dealt with from the modern standpoint, the experiments of Forel and others on the sight of the eyes and ocelli are described and commented on; and so on. No question of ant biology, but what is dealt with; all the annotations fill in the body of which Lubbock's original was only the skeleton.—HY.J.T.

CORRECTIONS:—On page 67, 5 lines from the foot of page, in place of \$1.000.000 read \$1,000.00.

On page 62, for *sigardi* read *sicardi*.

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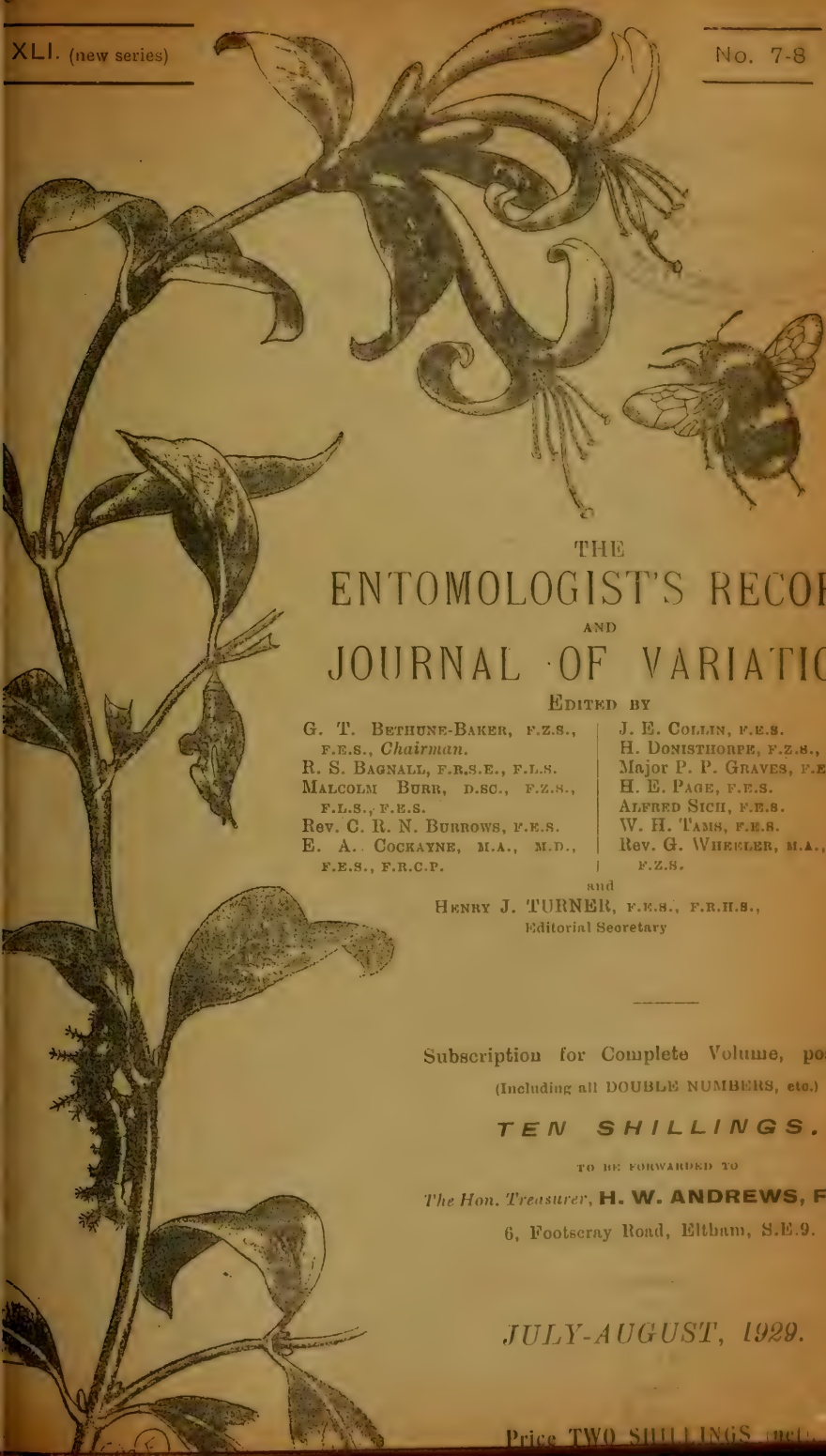
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Lepidoptera at Les Jacquets, Gironde, from July 29th, to September 14th, 1928.

By Wm. FASSNIDGE, M.A., F.E.S.

The village of Les Jacquets lies on the western shore of the Bassin d'Arcachon, about four km. inland from the Atlantic Ocean, in a country of sand dunes and pines. It is reached from Bordeaux by rail to Arcachon, then by the little steamboat to Picquey, a mile south of Jacquets, or by motor pinnace direct from Arcachon. But since a road was made two years ago from Arès to Picquey, one may travel from Bordeaux via Factice to Arès, and then to Jacquets by motorbus during the summer months. The whole region is one of sand dunes and pine forests, with an undergrowth of gorse, broom, tree heather, service tree, bramble, stunted oak and willow. Further inland other trees are mixed with the pines so that the Fauna is by no means as monotonous as one might expect. Of arable land there is none, and only an occasional patch of grass land may be found among the pines. Salt marshes occur all around the Bassin and small fresh water marshes occur rarely. There are no streams nearer than Arès and no ponds save the artificial fish reservoirs peculiar to this region. The climate is very wet, rain falls through nine months of the year and all trees are covered with lichen. The temperature is moderate and free from extremes. The great ocean dune of windblown sand protects from the violence of westerly storms, while the vast forests give shade and shelter. Such a wild and uncultivated region is obviously very imperfectly known from an entomological point of view, for there are practically no roads, the sand makes walking very difficult, and except around the Bassin, houses are few and far between. It is a very simple matter to get lost in the maze of pines, and one might walk all day and never meet a soul.

Fortunately there exists a Catalogue of the Lepidoptera of the Gironde by Henri Gouin, published under the auspices of the Société Linnéenne de Bordeaux, of which the first volume deals with the microlepidoptera, 1915, and the second volume deals with the macrolepidoptera, 1922. The department as a whole has been fairly thoroughly explored so far as the lepidoptera are concerned, and a new catalogue which will revise and complete the older one, is at the present moment in course of publication by the group of lepidopterists known as the Ecole Bordelaise. From this Catalogue one may get a very good idea of the species most likely to be found in this region at any particular time, together with many useful hints as regards localities and foodplants. Obviously there were but few Rhopalocera that we could hope to take, apart from very common species. *Limnitis camilla*, Schiff. (*vicinaria*, Scop.) was fairly common, and *Satyrus statilius*, Hufn. occurred sparingly among the pines. A few odd specimens of *Hesperia malvoides*, Elw. were taken, and a single suffused specimen of *Grenthis scabra*, Schiff. Patient search among *Polyommatus icarus*, Rott. yielded only var. *icarinus*, Scriba, and no *P. thersites*, Cant., which species however, is stated to occur in the department. Throughout our stay the weather was exceptionally hot, and except for three or four very violent thunderstorms there was no rain. It was therefore to be expected that day hunting would be of little use, and that the best captures would be

made at sugar or at light. In practice we found that it was not possible to work both, so we decided to concentrate on sugaring; and to leave the Coleman petrol vapour lamp which we had brought with us for a future occasion.

The first difficulty was to find a sugar round, for so much has been said and written about the futility of sugaring pines that we hesitated to try them. However there was no choice, and finally a round was chosen that included a dozen acacias, planted near the bungalows for shade, some three dozen pine trees, and about eighteen posts by the edge of the fishpond. The pines gave the best results and the acacias the worst, possibly owing to their situation. All around the fishpond grew thick masses of sedges and grasses, and hard by was the Bassin fringed at this spot with tamarisks. A few hundred yards away was an extensive salt marsh, and westward the pines stretched nearly to the ocean. The first three nights were windy with a bright moon, and so very few insects came that we almost decided to shift our headquarters for the rest of the holiday. The fourth night however was hot and thundery and there were swarms of insects on every sugar patch; in fact the vast numbers of certain common species constituted the chief difficulty with which we had to contend throughout our stay, for it was utterly impossible on most nights to box any particular specimen from the sugar. Either a vast cloud of common noctuids, chiefly *Agrotis segetum*, Schiff., *A. ypsilon*, Rott., *A. saucia*, Hb., *Triphaena pronuba*, L., and *A. tritici*, L., flew off the instant the lantern beams fell on them, knocking off practically everything save the sluggish *Laphygma exigua*, Hb., or else countless myriads of *Nomophila noctuella*, Schiff., would smother the sugar in a wriggling, seething mass, rendering it impossible for other insects to get near the feast. Some idea of the prodigious numbers of *N. noctuella* on certain evenings may be gained from the following observation. On the evening of Sunday, August 5th, a motor car with powerful headlights came along the road where for a hundred yards it skirts the fish reservoir. The lights raised such a cloud of these moths, which fluttered thicker than snowflakes in the beam of radiance, that the driver was obliged to slacken speed and to feel his way until the swarm thinned out or was left behind. It was quite useless to try and net any particular specimen from the sugar, for it was impossible to get less than a score of insects in the net at a time. However we managed to get some good insects though many were missed, for later in the night the visitors came much less abundantly. Moreover, when common species are in such abundance, varieties are to be expected, and we were very pleased to get long series of fine forms of *Agrotis trux*, Hb., *A. tritici*, L., *Bryophila algae*, Fb., *Hadena didyma*, Esp., *H. bicoloria*, Vill., *Euxoa vestigialis*, Rott., *Leucania scirpi*, Dup., and one really jet black variety of *A. segetum*. Among the species taken in the first half of August were *Catephia alchymista*, Schiff., *Catocala optata*, God., *C. elocata*, Esp., *C. dilecta*, Hb., *C. conversa*, Esp., *Grammodes algira*, L., *Leucania putrescens*, Hb., *Athetis flavirena*, Guen., *Agrotis crassa*, Hb., *Hadena atriplicis*, L., *Callopietria purpureofasciata*, Pill., *Craniophora ligustri*, Fb., *Palimpestis octogesima*, Hb. Of these insects perhaps the best is *C. optata*, a speciality of this region. It came to sugar fairly regularly, always after ten o'clock summer time, usually much later, and in order to get good specimens, it had to be placed at once in the killing

bottle. At this time of the year the only flowers which could serve as a counter attraction were those of a species of heath, and they were mostly over. For this reason perhaps many species were seen at sugar which are not usually taken by this means, some perhaps which have rarely before been recorded as attracted by this bait, for example: *Drepana binaria*, Hufn., *Heliothis peltigera*, Schiff., *H. armigera*, Hb., *Eublemma ostrina*, Hb., *Hyponodes costistrigalis*, Stph., *Herminia cribrunalis*, Hb., *Dianthoea irregularis*, Hufn. (the only specimen taken), *Thalpocharis candidana* var. *impura*, Stgr., *Pseudopanthera hippocastanaria*, Hb., *Sarothrips degenerana*, Hb., *Pseudoterpna coronillaria*, Hb., *Diasemia ramburialis*, Dup., *Pyralis costalis*, Fb., *Antigastra catalaunalis*, Dup., *Agdistis tamaricis*, Zell. And not only lepidoptera but insects of other orders came, sometimes freely. Of the five species of antlions captured *Myrmelonis tetragrammica* came regularly to sugar: three species of Trichoptera were taken at sugar, namely, *Limnophilus marmoratus*, Curt., *L. affinis*, Curt., and *Phryganea varia*, Fb., one specimen only of each species, and no other Trichopteron was even seen during our stay; *Chrysopa vulgaris*, Sch., was a frequent visitor; many mosquitos were noted; two weevils came one night; ants naturally were a pest and several sugar patches had to be abandoned because of them; several hemipterous insects came, and spiders, slugs, snails, grasshoppers, harvestmen, earwigs and centipedes all claimed their share. Every night for more than a fortnight a ♀ *Mantis religiosa* was observed on the same sugar patch—not of course actually on the sugar but taking toll of the visitors, bluebottle flies by day and moths by night. She would eat a *L. exigua* while we were going our round and on our second visit she would be found with a *Leucania vitellina*, Hb., or an *A. segetum*, in her claws. I used to promise her an unpleasant end if ever she had the misfortune to choose a rarity like *Plusia ni*, Hb., for her supper, but so far as we saw, she never did. Night after night for a week she was roughly knocked off the patch with the sugaring brush, and every time she straightway returned, until like the importunate widow she got her own way and was left unmolested in the end. She was still there when we came away.

1928 will long be remembered as a remarkable year of insect migration, not only in England, but in France and Germany also. At Easter on the Mediterranean we had already noted the advance guard of *Pyrameis cardui*, L., *Plusia gamma*, L., *Heliothis peltigera*, Schiff., *Phlyctaenia ferrugalis*, Hb., etc., and at Jacquets we saw for the first time in our experience some of the rarer immigrants among the vast swarms of commoner ones. It should be noted that so far as we could judge, there appeared to be during our stay three successive waves of immigrants, decreasing in density and differing somewhat in composition. The first wave reached its height on Sunday evening, August 5th, lasted four or five days and was principally composed of *N. noctuella* and *L. exigua*, with other common immigrant species in fair numbers, but no unusual ones. About a fortnight later, the second wave arrived and a few specimens of rarer immigrants were seen, while *P. ferrugalis* was almost as big a nuisance on the sugar as *N. noctuella*. Still a fortnight or so later, the third wave came along, and brought with it many unusual captures, among them three *A. catalaunalis*, one *Margarodes unionalis*, Hb., one *Leucania unipuncta*, Haw., one *L.*

obsoleta, Hb., six *Plusia ni*, Hb., and two *H. armigera*. Of these species the first has not been recorded for the department before. *Colias croceus*, Foure., was everywhere common during our stay, but no distinct movement could be seen, nor were any variations in its numbers noticeable. *R. saccharia* turned up in strangely uneven numbers and in the most unexpected places, while *H. peltigera* flew for a time about the ocean dunes in simply enormous numbers besides coming freely to our sugar inland.

As has been already mentioned, the vast numbers of common immigrant Noctuae prevented us at times from reaping the full benefit of our sugar, for many shy species were deterred from coming to the sweets, and among such a jostling mass of insects it was often quite hopeless to select any particular specimen. Therefore, towards the end of August, we tried the experiment of sprinkling with sugar low bushes of pine or broom as well as trees and posts, with most excellent results. Some nights there were moths at every single drop of sugar, and the wonderful sight in the lantern rays can be better imagined than described. These sugared bushes often yielded better than the other patches, and from them many good insects were taken in spite of the greater difficulty of boxing. By day the sugar patches were visited by numerous flies, by *Vanessa atalanta*, L., *Hipparchia (Satyrus) semele*, L., *S. statilinus*, Hufn., and *Pararge aegeria*, L. Some twenty-eight pounds of Fowler's green treacle were used during the holiday, all of which had to be taken in our luggage, for it is quite impossible to procure anything in France except honey, which is at best a poor substitute, besides being expensive and often not available in August.

Frequently in the intervals of visiting the sugar patches, we would turn into the forest near by to search the few remaining flowers of heath with our lanterns. At the very beginning of August, one specimen of *Ocnieria rubra*, Fb., was thus taken, but the only other visitors to the flowers were *P. gamma*, *N. noctuella*, *Platyptilia acanthodactyla*, Hb., *P. hippocastanaria*. From the end of August we were able to capture a good series of *Gnophos tibiaria*, Rmbr., flying among the bushes after dark, and in the same way I had the good fortune to net a single ♂ specimen of *Crocallis dardoinaria*, Donz., which unfortunately at the time of capture was supposed to be only a curious form of *C. elinguaris*, L., which latter occurred sparingly. This is the second specimen recorded from the department, and it is unfortunate that the identification could not be made before our return home, for it is fairly certain that persistent searching would have been rewarded by other specimens. At rest on bushes were also found occasional specimens of *Pseudopteryna coronillaria*, Hb., and more frequently *Emydia cribrum*, L., of the form referred to var. *punctigera*, Frr.

Beating for larvae proved a failure as it usually does in France in the month of August; except for a single large larva of *Stauropus fagi*, L., beaten from oak, a few of *Oenistis quadra*, L. and one small larva of *Hyloicus pinastri*, L., the forest trees and bushes yielded practically nothing. Only the aged tamarisks that fringe the Bassin for some distance near the village yielded larvae in any numbers, and then only two species, *Macaria aestimaria*, and *Agidistis tamaricis*, the latter rarely. Of the former species larvae could be taken in nearly all stages throughout our stay, as well as perfect insects, and some numbers were bred by us too, for the duration of the pupal stage was only from 8 to 10 days while the weather was hot. By searching we succeeded

in finding a fair number of larvae of *Stenoptilia zophodactyla*, Dup., on centaury, and in one locality where there grew four or five plants of *Andryala sinuata* we found full fed larvae, pupae and imagines of *Oxyptilus distans*, Zell. A great deal of time was spent among the pines examining the resinous exudations, which are fairly numerous in this locality, in the attempt to collect some data concerning the *Dioryctria* of the region. This is a most vile and messy job, and it must be confessed that much labour was expended for very slight results. Resinous exudations are to be found in three stages, usually, though not always, at some point on the trunk where injury has occurred, either by the lopping of the lower boughs or by the process of tapping the pines for resin. The first stage is quite a tiny exudation of a reddish colour, the work of the very young larva of *D. splendidella*, H.S.; the second is a comparatively large, still partly soft mass of yellowish resin, caused by the full fed larva of the same insect, which may occasionally be dug out from its burrow between bark and wood, where it moves about actively in a sticky liquid flow of freshly exuded resin; the third consists of a hard coagulated tumour, often blackish on the outside, sometimes several years old, within which may be found the empty pupa case of *D. splendidella* in its slight silken cocoon. Towards the end of August we succeeded in finding the first living pupa after seeking in hundreds of tumours, and we found in all five, which yielded moths during September. It would seem as if no very serious damage is caused to the tree by the larvae of *D. splendidella* except in a few rare cases when two or more larvae chance to bore horizontally round the stem of a young tree at the same height. Then a strong wind sometimes snaps off the whole upper part of the tree some seven feet from the ground almost as cleanly as if cut with a saw. Naturally this can only happen with pines of about six to nine feet in diameter, and we saw only a few instances of such damage during our stay. So far there has been only one other species of the genus *Dioryctria* authoritatively recorded from the Gironde, namely, *D. mutata*, Fuchs., to which all records of *D. abietella*, Fb., are almost certainly to be referred. The life history of *D. mutata* appears to be at present quite unknown. The larvae are supposed to feed in cones and twigs, like those of *D. abietella*, but we were quite unsuccessful in our search for any traces of it. About twenty specimens of *D. mutata* were taken at sugar, but *D. splendidella* did not put in an appearance on our patches. *D. abietella* has not yet been found in the Gironde, but there seems no reason why it should not occur there.

Hunting with the net by day, although on the whole very unproductive, yet yielded a few interesting species. On the salt marsh grew in plenty a species of *Inula* very closely allied to, if not identical with, *Inula crithmoides*, L. At the blossoms of this plant could be taken for about a week in mid August fair numbers of *Thalpocharis parva*, Hb., which seems to be a rare insect in the department. A few micros were also found, among them *Epiblema caccimaculana*, Hb. and *Conchylis affinitana*, Dgl., both new species for the department, and *Bactra furfurana*, Haw., of which only two specimens are recorded in Gouin's catalogue. The chief inhabitants of these marshes were vast hoards of grasshoppers, with innumerable huge yellow and black spiders and mantids. Every flying insect fell a prey to these spiders, whose webs contained the remains of all kinds of lepidoptera, even

species so robust as *Macroglossum stellatarum*, L. and *P. cardui*, L. being easily and commonly captured. From the rank herbage fringing a disused reservoir were beaten two specimens only of *Hydriomena polygrammata*, Bkh. In one of the broad "garde-feu" or rides cleared to prevent fire from spreading, a colony of *Aplasta ononaria*, Fueschl., was found among *Ononis spinosa*, and in two or three visits a good series was secured. The great ocean dune, and the stretch of open ground that separates it from the forest, were disappointing, for the only interesting species taken there were *Thalpochares candidana*, Fb., var. *impura*, Stgr., in numbers, and one *Deilephila lineata* var. *livornica*, Esp., disturbed by day. Vast numbers of *N. noctuella*, *H. peltigera* and *P. gamma* made it difficult to catch anything else, whenever we ploughed over the four kilometres of sand dunes that separate the Bassin from the ocean.

Such a district, where sand is the dominating feature, is the favoured habitat of antlions, which can only exist in hot and sandy situations, where even the heaviest shower is at once absorbed. The antlions have their pits in countless myriads, on every slope, on every forest path, in gardens, on the dunes. By careful blowing the larvae can be exposed and captured, but digging is generally useless. Only small pits could be found in August, but they were so numerous that it seems wonderful what all the occupants live on. Of perfect insects five species were taken, either disturbed by day or flying by night. As already mentioned one species came fairly freely to sugar, while another, *Acanthaclisis boetica*, Rmtr., of which three specimens were taken flying late at night, is said to be very rare. Typical of the region too are the cicadas, which were in great force around Arès throughout August. Large numbers of migratory birds make their appearance in September and are cruelly and ruthlessly slaughtered and eaten—even the tiniest—by the somewhat primitive inhabitants. Altogether this is a most interesting place for a summer holiday, there are plenty of spots still unexplored, the insect fauna is extremely rich, and we can but assure those who may contemplate a visit, that they are almost certain to be well rewarded.

For the sake of the records a short list of interesting species taken and not already mentioned is here added: *Nola albula*, Hb., *Leucania L-album*, L., *L. littoralis*, Curt., *L. unipuncta*, Haw., *L. obsoleta*, Hb., *Tapinostola fulva*, Hb., *Agrotis ripae*, Hb., *Heliophobus hispidus*, Hb., *Hecatera chrysozona*, Bkh., *Caradrina kadenii*, Fr., *C. superstes*, Tr., *Bryophila muralis*, Forst., *Agrotis leucogaster*, Fr., *Boletobia fuliginaria*, L., *Ephyra pupillaria*, Hb., with var. *gyrata*, Hb., and var. *badiata*, Stgr., *E. ruficiliaria*, gen. est. *privataria*, Bast., *Emmelesia unifasciata*, Haw., *Gnophos glaucinaria* race *panessacaria*, Trimoulet (*plumbearia*, Stgr.), *Crambus malacellus*, Dup., *C. fascelinellus*, Hb., *C. latistrius*, Haw., *Ephestia elutella*, Hb., *Euzophora fuliginosella*, Hein., *Nyctegretis achatinella*, Hb., *Acrobasis porphyrella*, Dup., *A. fallonella*, Rag., *A. glauella*, Stgr. (a single specimen only: new for the department), *Simaethis nemorana*, Hb.

For kind help in the determination of doubtful forms and difficult species, our best thanks are due to the Commandant de Sandt., Secretary of the "Ecole Bordelaise," who would be glad to have records, accompanied by specimens in critical cases, from entomologists who have collected in the Gironde, for publication in the Revised Catalogue.

The Dipterous Guests of British Ants.

By F. W. EDWARDS, F.E.S.

It has long been known that a number of insects are fed and tended by ants, or live in their nests either as guests, "indifferently tolerated lodgers," parasites, or predators. The best known of such insects are among the Coleoptera and Hemiptera, but recent studies in various parts of the world have brought to light an increasing number of Diptera, which are more or less inseparably related to ants in one of the four or five ways noted above. An excellent summary of the subject, with special reference to the British species, is given in Mr. Donisthorpe's book,* and the author is heartily to be congratulated on the results obtained from his long and painstaking research in this field, and the admirable manner in which these results are presented. One of the most interesting discoveries recorded is that the curious slug-like larvae of *Microdon*, whose feeding habits were long a mystery, are absolutely dependent upon the ants for their food, which consists exclusively of dry pellets ejected by the ants from their mouths. Most or all of the other British Diptera breeding in ants' nests are believed to be either general scavengers, or else parasites of the ants (larvae or adults), but it is evident from the perusal of this chapter how much still remains to be discovered about them, and it is not improbable that some of the intimate forms of relationship, shown to exist between ants and Diptera in other countries, may yet be revealed in Britain. Mr. Donisthorpe briefly refers to some of these cases, as for example the mosquito (*Harpaomyia*) which solicits and obtains food from *Cremastogaster* ants in Java and West Africa (also in the Philippines, Ceylon and other tropical countries of the old world); the blow-fly (*Bengalia*), which robs driver-ants of their pupae in Africa; the North American Phorid (*Metopina*), whose larvae clings around the neck of the ant larva and gets itself fed at the same time as its host; and the remarkable Leptid larvae (*Vermileo* and *Lampro-myia*), which trap and feed upon ants in the Mediterranean region (also in the Malay Peninsula and probably elsewhere) in the same manner as the true "ant-lions." To these cases might also have been added the strange West African Cecidomyiid (*Farquharsonia*), which watches for one ant to feed another and then, hovering over the pair, without alighting sucks up the droplet of food; the unpleasant West African Ephydrid (*Rhynchopsilopa*), which chases ants from behind and obtains food from the anus; and the North American Phorid (*Apocephalus*), which parasitises adult ants, its larva living in the head of the host, causing it to drop off. Among British species, it would not be surprising to discover that the female *Forcipomyia myrmecophilus* obtains its food in some way from the ants, as the females of this group of genera are known in many cases to suck the blood or exudations of living insects. Further, there must surely be some close connection between adult *Phyllomyza* and its ant hosts, perhaps in relation with the peculiarly enlarged antennae and palpi of the fly.

Two remarks seem called for in regard to *Platyphora*. First, the conclusion that the larvae are parasitic seems to be based on circumstantial evidence only; more definite observations of the life history of

* *Guests of British Ants.*

these remarkable flies must be made before the case can be regarded as proved. Second, the name *Platyphora* is preoccupied and should be replaced by *Aenigmatias*. In regard to the *Sciaridae*, the author remarks that it remains to be proved whether any are strictly myrmecophilous; as he suggests, many of them are probably general scavengers and their presence in the nests is to be regarded as more or less accidental, but some (such as the short winged *Peyerimhoffia brachyptera*, and perhaps the wingless female of *Lipidapus venaticus*), are most likely true myrmecophiles. In August last I found one of these brachypterous Sciarids common on nests of a *Formica* near New York, both sexes running about over the surface of the nests and entering the holes. I do not agree with the author however that *Allostoomma subterranea* is a true myrmecophile; I believe the species is synonymous with *Pnyxia scabiei*, which has repeatedly been found feeding in rotten potatoes.

One or two minor errors may be noted: On p. 129, last line but one, the date 1917 should be 1914; p. 133, the species *femorata* is not an *Aphiochaeta* but a *Hypocera*; p. 136, *Harpagomyia* is a *Culicid*, not a *Chironomid*, as seems to be suggested in the text.

Some Noctuae Varieties in 1928.

By A. J. WIGHTMAN, F.E.S.

(Concluded from p. 88.)

Xylina socia, Rott.—In addition to the brownish ochreous typical form, forms *pallida*, Tutt., *umbrosa*, Esp., *petrificata*, Esq., and *rufescens*, Tutt., were obtained. Some of the specimens of form *petrificata* are very extreme, the black-brown in the inner margin extending more than halfway up toward the costa and continuing in a wide unbroken band up the outer margin almost to the apex, the insect being more black-brown than ochreous. In these extremely heavily marked specimens the costal area is as pale as in the form *pallida*.

Xylina semibrunnea, Haw.—This species seems as constant as its congener is protean. I have taken many specimens in Surrey and East and West Sussex in the last 20 years but never has a specimen which could be said to differ from the type form come my way until this autumn when I took what I believe to be a pale form, and being a ♀ I am keeping her with others of both sexes in an endeavour to obtain ova in 1929. I cannot say however that I am sanguine of breeding anything but the typical form, even if I breed a large number.

Orrhodia vaccinii, Linn., and *O. ligula*, Esp.—These two very variable species were exceedingly plentiful during October and November, and I took a very long and beautiful series of each. They have much the same range of ground colour shades, although ochreous and reddish-ochreous ground colours are plentiful in *vaccinii* and rare in *ligula*, while blackbrown shades are plentiful in *ligula* and rare in *vaccinii*, and when long series of each species are compared, it is at once evident that *vaccinii* is largely a red species and *ligula* a brown one. When in perfect condition it is hardly possible for anyone knowing both species well to be in any doubt as to which species any individual specimen should be referred; for in addition to the very different

shape of the anterior wings, there is a definite, if somewhat slight difference in the markings, and even in the deeply coloured and almost unicolorous forms, enough of the markings can be made out on careful examination to render identification certain.

O. racemii, Linn.—The forms of this species can be roughly divided into 3 groups. A. Unicolorous. B. Distinctly marked. C. Banded.

The references to figures are South, *Moths of Brit. Isles* Vol. II., plate II.

GROUP A. Unicolorous.

Except in the most extreme dark forms the transverse lines can be traced, being slightly darker than the ground colour.

1. Pale reddish-ochreous rather paler than fig. 1 (*erythrocephala*).
2. Chestnut inclining to terra-cotta the type fig. 3.
3. Bright-red, form *rufa*, Tutt, *Brit. Noct.* Vol. 3, page 3.
4. Smoky red or brown with red tinge.
5. Blackish-red form *unicolor*, Tutt, *Brit. Noct.* Vol. 3, page 4.

GROUP B. Distinctly marked.

In this group the ground colour is of one shade, while the basal area, basal, inner and outer lines, outlines of stigmata, lower half of reniform stigma, costal streak, narrow submarginal band, and an oblong spot between the reniform and orbicular, are of some darker shade.

1. Greyish-ochreous; markings in pale reddish grey probably form *ochrea*, Tutt, *Brit. Noct.*, Vol. III, page 3.

2. Pale reddish ochreous; markings in pale reddish grey, form *mixta*, Staud., as South fig. 4, but greater contrast between ground colour and markings.

3. Deep reddish-ochreous; markings in deep reddish-brown = form *spadicea*, Hb.

4. Yellowish-brown; markings grey-brown.

5. Ashy blue; markings in bright red, the most beautiful form I have taken and apparently un-named.

6. Blackish grey; markings dark scarlet; nervures in ashy-grey, partly obscured by a dusting of dark scales. This form is so dark that it appears almost unicolorous until closely examined. I think this is form *obscura*, Tt., *Brit. Noct.*, Vol. 3, page 4.

7. Pale ochreous; markings in reddish brown; nervures pale ochreous. This is an extremely variegated form and probably Tutt's form *variegata*, *Brit. Noct.*, Vol. 3, page 3.

8. Whitish grey; markings in dull red; basal and central areas much suffused with slaty grey but not enough to place the form in the next group C. It is a modification of form 5.

GROUP C. Banded.

1. Pale reddish-ochreous; basal and inner areas slaty-grey: a narrow slaty-grey band along the submarginal line: usually the reniform and orbicular stigmata are of the pale ground colour; and the fringe is pale; form *suffusa*, Tutt, South, fig. 5.

2. As no. 1 above, but outer margin and fringe dark like central area; the only pale area of the wing being that between the outer transverse line and submarginal band.

3. As no. 1 above, but ground colour rich red; submarginal band reduced to a few black spots; fringe red; transverse lines bluish grey.

4. As no. 1 above, but central area marked in blue grey web; the transverse lines and nervures being very pale blue grey; as also outlines of stigmata.

5. As no. 1 above, but the upper half of central area pale like the outer area; stigmata obsolete, dark line along costa. It is a combination of South's figs. 5 and 6.

O. ligula, Esp.—The forms of this species fall roughly into 3 groups as in *vaccinii*, i.e., A. Unicolorous. B. Distinctly marked. C. Unicolorous except for pale band in outer area and sometimes pale edging to transverse lines.

GROUP A. Unicolorous.

1. Chestnut, inclining to terra-cotta as South fig. 3 (*vaccinii*).

2. Indian red.

3. Blackish brown, as South fig. 10 = form *spadicea*, Haw.

GROUP B. Distinctly marked. Ground colour in one shade and transverse lines, basal area, outlines of stigmata, lower part of reniform stigma, narrow band in submarginal line, costal streak, oblong mark between reniform and orbicular stigmata in some darker shade and clearly defined.

1. Paler eddish ochreous; markings deep red-brown, much like form *mixta*, Staud., of *vaccinii*.

2. Greyish white sprinkled with reddish atoms; markings in pale red-brown, pale grey band in outer area, nervures whitish-grey, altogether greyer than South fig. 9, and more like fig. 2 (*erythrocephala*), but with pale nervures and no dark area. The rarest form of *ligula* which I get here, except no. 1 above.

3. As no. 2 above, but without pale nervures and more dusted with red scales.

4. Reddish brown; markings distinctly darker, but not in such strong contrast as forms 1-3 above, edging of transverse lines and band in outer area dull blue-grey, like South fig. 9, but more distinctly marked.

5. Reddish brown; markings almost lost in ground colour, slight ashy band in outer area as South fig. 9, called *polita*, Hb.

GROUP C. Unicolorous, except for pale band in outer area and pale edge to transverse lines in some forms.

1. Reddish-brown with pale grey band in outer area as fig. 8, but much paler and more reddish shade of brown.

2. Chocolate brown, pale grey edging to transverse lines, and pale grey band in outer area, fig. 7 South.

3. As No. 2 above, but without the pale edging to transverse lines, rather more unicolorous than South fig. 8, and the band in greater contrast.

4. Deep chocolate brown with pale ochreous band in outer area = *subnigra*, Haw.

I must note here, that I have never taken this form with the nervures pale = *ochrea*, Tutt. A form Tutt considered common.

I have avoided calling any form, the type or form *polita* as South and Tutt are by no means agreed as to what those forms actually are like.

Three specimens which I have, hardly fall within any of the above Groups. The first is as South fig. 7, but the central area is of a much paler and more yellow shade of brown, the second is the same form

except that the basal half of central area is much darker than the outer half, in fact the central shade is the dividing line between the dark and pale areas of the wing, although the hind margin is dark like the basal half of wing; while the third is unicolorous pale chestnut red in basal and outer areas with the central area much suffused with black scales, varying from pale putty colour to rich purplish red.

Heliothis peltigera, Schiff. —Larvae of this species occurred along the Coasts of Kent and East Sussex in immense numbers, from July to September. I failed to find any on the West Sussex coast or in East Hants, but they certainly occurred much further west (Devon), so possibly I was unfortunate in my choice of localities to search.

When collecting larvae of the later broods with Mr. E. P. Sharp in September, he called my attention to the fact that the larvae we were then taking were almost all marked with reddish on the dorsal area, which made them hard to see, as the food-plant was dying and had many shrunk and pinkish leaves, whereas those larvae we had taken in July were for the most part entirely green and of course the food-plant at that date was also without the pinkish leaves.

The variation among the imagines is quite considerable.

The Asiatic origins of the Western Palaearctic *Rhopalocera* exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

(Continued from page 91.)

THE CENTRAL EXERGE DALMATINA-CAUCASICA, SIDGR.—This exerge differs on the whole from the Northern exerge *didyma* by the following fundamental features: The wings are broader and rounder at apex; the fringes shorter and the contrast between the black and the white less sharp; the fulvous brighter and of a clearer tone, due to a greater proportion of yellow as compared with the red, on both surfaces; the underside of hindwings is never as white as it usually is in nominotypical *didyma*; the extent of the black pattern tends to be lesser and often is very much so; there is much more difference between the development of the various rows of spots, so that the pattern is much less uniformly distributed over the wing; as a rule the submarginal and the basal rows are more reduced than the central肘ed row; on the underside of hindwings the little black streaks are thinner and shorter. As I have remarked at the beginning of this paper, variation in this exerge is incomparably broader than in the Northern and in the Southern ones and to it are due also those of the synexerges described above. It is helpful to one's memory to divide the races and the seasonal forms of Europe, as far as they are known, into three groups:

One of large size (some females are giants as compared with the average specific size), with very broad wings and usually a very bold black pattern and a rich colouring, produced by damp, warm localities, in the I. generation: *caucasica*, *græca*, *patygosana*, *subpatygosana*, *eutitania*.

The second, including the medium forms of the I. generation, produced by drier localities: *protea*, with its secondary races *palustris* of swampy localities and *apenninigena* of high altitudes, *romana*, *neerac-formis*, *meridionalis* and probably *mauretanica*.

The third, the very small forms of the II. generation, of a very yellow fulvous and of a pale dull ochreous: *romula*, *leopardata*, *dalmatina* (= *bosphorana* = *roccii*), *caldaria* and probably *occusus*.

I can have no pretence to describe and to discuss fully the races and forms of Anterior Asia and of the Balkans, because the information one finds about them are very fragmentary and I am, personally, far from having the necessary knowledge to complete them. Those of Peninsular Italy I have described in the *Ent. Rec.* of 1919, p. 179, of 1922, p. 12, and of 1924, p. (36), so that I can avoid going over them again here. I will thus limit myself to a few remarks, which may be useful as memoranda for the future.

The name of *CAUCASICA* was given by Staudinger in the 1861 edition of his *Catalog* to Herrich-Schäffer's fig. 588-90. It was not a very fortunate one, because the latter informs us in his Supplementary volume, p. 4, those specimens were "obtained by Lederer from Elisabetpol" and their aspect shows they must come from the great marshes of that region and not from the Caucasus, to the north of them; I think we can include it in the European races, as it is very likely it spreads along the shores of the Caspian. The result of this name, owing to the neglect of original figures and descriptions, is that Christoph has redescribed the race of Elisabetpol under the name of *kaschtschenkoi* and that, even in collections such as Rühl's, one finds the name of *caucasica* applied to the alpine race of the Caucasus, which is about as different from H.-S.'s figures as it possibly could be. I have described it in the first part of this paper, transferring it to *didyma* and correcting the blunder I had made in 1922, in the *E.R.*, p. 18, where I had named it *CAUCASI* as a race of *M. trivia*, which it resembles very much.

In Transcaucasia race *TRANSCAUCASICA*, Turati, apparently is the one of dry localities, corresponding to *protea* in Italy.

Two males of *didyma* collected by Phillips at Yozgat, 5,000 ft., in Asia Minor, during June and July, are apparently exactly similar to those of true *MERIDIONALIS*, Stdgr., from Sicily, but it will be necessary to see the females before applying this name to them. It is the most peculiar aspect of this sex, with the ground colour of the forewing entirely covered by an even greenish-grey suffusion and no trace of fulvous in most individuals (11 out of 14 in my series from Palermo), which distinguishes this race sharply from all others. The name was published in 1861, but as there is no description and no reference it was then quite a "nomen nudum" and the indication of "Sicily and Turkey" are nul. It became valid in 1871 on the strength of the description published that year in the *Horae Soc. Ent. Rossicae* for 1870, followed by the 1871 edition of Staudinger's Catalogue, where a reference to the *Horae* is given, with "Sicily, Turkey, Greece, Asia Minor and Syria" as habitat. This area is very probably quite the right one, it being impossible to mix up this highly characterised race with any other, when one is acquainted with it. The innumerable records of it from all sorts of localities of Southern Europe are due to its having been unknown to most authors before Seitz published his excellent figures. Bang Haas kindly informs me that the specimens labelled by Staudinger in his collection are from Sicily, so that one can be satisfied it is the locality of the "types," although he was dealing with Mt. Parnassus when he first described it; one must bear

in mind he described several other varieties, from different localities, in the same paragraph and he quotes *meridionalis* particularly from the 1861 Catalogue, where Sicily is the locality. Stauder has renamed it *sicula* in the *Lepidopt. Rundschau*, II., 10, p. 107 (1928), but he has admitted *in litt.* to me that he only did it because he was not aware of its being true *meridionalis*!

Another variety of Anterior Asia, which is well worth distinguishing definitely, is the one figured by Herrich-Schäffer, figs. 324-7, from "the southern slopes of Mt. Ararat." I presume it is the II generation of *meridionalis*, as the Ragusa collection contains, from Sicily, summer specimens which are *caldaria*. By its general aspect the Ararat race stands very near the *caldaria*, Vrtý., of Tuscany, except that in the male figured the black pattern is reduced on upperside to an extent only met with in extreme individual forms of Italy, as it is nearly entirely obliterated in the basal half of the wings, and the marginal streak is reduced to minute internervular dots (out of my 75 male cotypes from Florence only 3 are of this description); these characters are much more frequent in the female sex, in Tuscany, but H.-S.'s female, on the contrary, has quite the average *caldaria* development of the black pattern. What makes me, however, consider the Ararat race should be distinguished from *caldaria* is the underside, where the apical yellow space spreads further down the wing, the fulvous bands are moreover, more broken and of a very pale nearly yellow colour and the black streaks are distinctly thicker and longer, whilst in the female there is even an extra row of blackish shading on the inner outline of the outer fulvous band. All these features are an approach to *casta* and *deserticola* of the Southern exerge and make one strongly suspect a synexerge. I propose validating the name of **araratica**, which Staudinger curiously places as a *nomen nudum*, between brackets, after his *dalmatina* in all his writings, quoting the Ararat male figured by H.-S. as being that of the female from Ragusa in Dalmatia. I have pointed out that even as individual forms they are entirely different from each other and, anyhow, the act of separating the sexes of the same locality under different names, ignoring the fundamental features which they have in common, proves the absurd results of giving names based on one or two individual characters and lacking an inclusive perception of racial aggregates, which exist, however broad individual variation may be within them.

I must mention the minute summer form described in 1909 by Oberthür from Akbès (Syria) as *LILLIPUTANA*. He says some males are not larger than *L. agestis* and have the fulvous bands of the underside extremely broad and developed. I notice this is the case also in *bosphorana*, Culot, and in dwarf individuals of more northern localities. It is very likely that *lilliputana* is nothing but another synonym of *DALMATINA*, Stdgr. = *bosphorana*, Culot, 1906 = *raceti*, Trti., 1920) as restricted and defined by me in accordance with the "typical" figure 131 by Herrich-Schäffer of a specimen from Ragusa to which the name was given in 1861. In the *Horae* (*i.e.*) Staudinger describes *dalmatina* as follows: "In the Peloponnesus, on the Taygetus, presents itself exclusively the form, which I have called var. *dalmatina* (*araratica*), a small form of a light ochreous yellow, at least in the females, with a disappearing black pattern, so that, for instance, the two rows of black spots, counting from the margin, lack nearly

entirely." The name was quite valid since 1861 on the strength of the figure quoted, but this description fits it perfectly and evidently also includes *caldaria* and *araratica*, I have lately separated.

As far as I have been able to make out, in Dalmatia, and also in the rest of the Balkans and of Asia Minor, in the same way as in Liguria and in Peninsular Italy, *CALDARIA* usually constitutes the II. generation (I have some of June 6th from the Achilleion of Corfu, which would seem of the I. generation), followed by *romula*, Vrtý., in its late emergencies, and *dalmatina* only replaces *caldaria* racially, here and there, in certain localities. It is extremely unfortunate that in a popular book like Seitz's one should find no figures of these forms of the II. generation and the reader should be entirely misled by the statement they "resemble *persea*, Koll., very closely"; there scarcely is any approach to the Persian race, as figured by him, except in a few subtle features of *araratica*. The features which distinguish *caldaria* from *dalmatina* are the following: Size more variable and on an average not as minute; wings usually more elongated; fulvous not as dull and ochreous, but brighter and warmer, especially in the female; black spotting exceedingly variable and ranging from the complete rows of well-marked spots of *leopardata*, Vrtý., which is constant as a secondary race in the Isle of Elba, to forms similar to the male typical figure of *araratica*, in which many are obliterated and others very thin indeed; the difference in the development of the various rows is a marked feature, the central elbowed one often being quite prominent, whilst others are entirely abolished (in *dalmatina* they all are more of the same minute size, except the inner submarginal one, which is usually missing); the marginal black streak tends to break up into a row of internervular dots, as it is specifically on the underside; these dots are quite separated and many do not even touch the margin any more, as in *deserticola*, in 25% of my male cotypes and in 50% female ones, from Florence; in *dalmatina* the marginal streak is thin, but always continuous, although they are rarely reduced to such minute specks as in *araratica*.

As to the blunder of lumping *ROMANA*, Calb., with *dalmatina*, following the initial one made by Staudinger in 1901, I need not repeat the remarks about it I made in the *Ent. Rec.* 1922, p. 12, when I pointed out that Calberla's "cotypes" were of May and June and his description applies to the I. generation of the driest localities of Central Italy, of a lighter tone of fulvous and with the black spotting more restricted than in *protea*, Vrtý., of less dry localities. In some, such as Florence, *protea* constitutes the early emergence of May, and *romana* the later one of the same generation, of late June and early July.

The average aspect of *PROTEA* can be described as transitional from *romana* to *subrubida* and *rubida* of Central Europe, but it is always distinctly different from the two latter by its clearer and more vivid fulvous. Its secondary race of high altitudes in the Apennines, *APENNINIGENA*, Vrtý., is distinguished by the much heavier black spotting, and seven, out of my 42 female "cotypes" from the Prato Fiorito, 1000m., above Lucca, are also shaded, over most of the wing surface, with greenish gray and resemble *ravallina* of S. Tyrol. In another melanic secondary race from the marshes of the Tuscan coast, *PALUSTRIS*, Vrtý., the spotting is not much more than in *protea*, but 50% of the

females are covered by a dark blackish suffusion, which only leaves a fulvous area on the forepart of the hindwings. In Liguria *protæa* constitutes the I. generation in all the localities situated at a certain distance from the sea, which are usually valleys at medium altitudes, and it spreads to dry localities of the South of France, where, in some, it keeps quite pure, exactly resembling the Tuscan one, whilst in others it is beginning to turn into the *rubida* syn-exerge. We will presently see it has proceeded as far as Catalonia and produced a syn-exerge with the Southern exerge.

As regards the very large, broad-winged and boldly marked races of the *caucasica* group, my *SUBPATYCOSANA* can be described as a little smaller and usually of a less rich tinge of fulvous in the female, but otherwise very much like it; one of my cotypes even has a vestige of the white spaces on the subcostal nervure, before the apex, which is very conspicuous in Herrich-Schäffer's figures and one of my males is very transitional to the peculiar shape of the submarginal spots, which makes that author's figure resemble a female; in *subpatycosana* the wings are also shorter and broader in both sexes and the male is of a richer, redder colour, contrasting more with the female; I have described it from the narrow, shady and damp Camaione Valley, near Lucca. It spreads all along Liguria at sea-level, in the little damp valleys, and we have seen it reaches Montpellier, in France. From Pegli, near Genoa (July), a peculiar local secondary race of it has been described by Frühstorfer as *EUTITANIA*: in size he says it surpasses Seitz's figure of *turanica*, which is exactly what *subpatycosana* does, but the ground colour is of a pale ochreous yellow and the hindwings have scanty black markings; these few words of description sound as if it were an approach to the much smaller *magnaestiva* of the French II. generation. In Italy the II. generation of *subpatycosana* consists of *ROMULA*, Vrtý., which in size and in pattern is intermediate between *caldaria* and *romana*, but with a slightly reddish or more pinkish and duller tone of fulvous.

In the south of Italy *subpatycosana* is replaced by *PATYCOSANA*, Trti., described from the marshes of Paola on the Calabrian coast, whose female has the fulvous replaced by yellow and broadly shaded by a greenish-grey scaling, although not as fully and evenly as in *meridionalis*. Turati described this race as being entirely different from any other, but in reality it is simply intermediate between *subpatycosana*, which had not yet been discovered, and race *GRAECA*, Stdgr., described from Karpenisi in N. Greece: here the male has a very thick black pattern; the submarginal band, in particular, "comes so close to the marginal one that they often blend partially, and especially on the hindwing; the females are predominantly of the greenish-grey form, often even over the whole hindwing, whereas in var. *caucasica*, which in the male is very similar to it, the female is predominantly golden red." The name of *graeca* was made valid by this description and a figure of 1871 in the *Horæ*, 1870, p. 60 and pl. I., f. 3; in the 1861 Catalogue it had been published as a *nomen nudum*; in 1901 Staudinger sunk it as a "subvariety" of *meridionalis*, quite overlooking its close connection with *caucasica*.

Here, I think, should be placed the distinct race *NEERAEFORMIS*, Vrtý., of high altitudes on the Aspromonte mass, in Southern Calabria, because it apparently is the mountain form of *patycosana*:

both sexes differ from it chiefly by the much more elongated shape of the wings, which recalls *neera* and the Iberic races, and by the very bold underside pattern and the very reddish tone of the fulvous on that surface, which increase the resemblance; the females above are of a rather peculiar pinkish colour and the black pattern is not more developed than in an average *romula*, which this sex resembles considerably, except for the much larger size and the underside appearance.

SYNEXERGES PRODUCED BY CROSSINGS OF EXERGE DALMATINA-CAUSICA, STDGR., WITH EXERGE CASTA-OCCIDENTALIS, KOLL.-STDGR.—It is chiefly in Anterior Asia these two exerges have come together, so that it is there most of their synexerges are to be expected, but, for the present, I am only acquainted with *aravatica* I have dealt with above. Their subsequent encounters have been in Algeria, in Morocco and in Catalonia, as can be inferred by the following facts.

A somewhat unexpected one to be observed in the *didyma* of Algeria and Morocco, else than *deserticola*, is that the underside of the hindwings exactly resembles the one of *protea* and other races of the Central exerge, because its black streaks are shorter and thinner, its marginal dots more minute and the orange bands of a lighter tone than in any Iberic race; what differs from *protea* and comes nearer to the latter is the greater size of the black dots on the forewing; as to the upperside the black spotting resembles *protea* by the fuller and more uniform development of the varicus rows than in the Iberic races and by its greater variability in the females, in many of which it is shaded with gray on its outline and even accompanied by a gray suffusion; two females I have from Le Tarf (Algeria), of the beginning of June, are identical with some of my Florence ones, save for the spotting of the underside of the forewing; the males, on the contrary, have distinctly larger spots also on the upperside and those of the hindwing are much less restricted and partly effaced than they are in *protea*; the tone of fulvous, too, is much duller. This is MAURETANICA, Obth., as restricted by me in the *Ent. Rev.*, 1919, p. 180, when I named *occusus*, Oberthur's figures 2299-2300 of July from Yakouren, which differ from it by their much lesser size, shorter wings, more ochreous colour, more restricted basal suffusion and much thinner black pattern generally. In Europe *occusus* can only be compared with a very large *dalmatina*=*bosphorana*=*roccii*. I have August specimens from Fez, in Morocco.

Not being acquainted with race *NISSENI*, Rothsch., described from Ain Draham (July-August), I can only place it tentatively here as the one corresponding to *occusus* in Eastern Algeria, and West Tunisia to which Rothschild restricts it (*Novitates Zool.*, XX., p. 115 (1913) and XXIV., pp. 100-101 (1917)); its size and general aspect are, apparently, intermediate between *mauretunica* and *occusus*.

The total lack in a large number of *mauretunica* and of *occusus* of some fundamental characteristics, which are most constant in the Iberic races and which are carried to their extreme development in *deserticola*, Obth., together with the fact that the latter exists in the same regions as the two former, although on grounds of a different nature, seems strongly suggestive of a different origin. It might be explained by a comparatively recent invasion of the ancestors of

mauretunica and *occasus* from the Balkans through the Greco-Tanaisian isthmus, and most probably at the beginning of the Pleistocene, just before the break up of this isthmus and under the stress of a Glacial period. Their Central exerge constitution would, during that cold period, have had an advantage over the Southern exerge constitution of the races they met with in Africa and it thus would have had a chance to push in amongst them. There, they apparently have kept on breeding more or less true, as seen in *mauretunica*, in certain localities, chiefly of Algeria, whilst in others they have intercrossed with *occidentalis*. I have specimens of July from Fum Kheney, Mekney (Morocco), which in both sexes are like *occidentalis*, but with more pronounced black markings and a dull tone of fulvous, on the upperside and like *protea* on the underside; they are suggestive of a synexerge, which I should record as race **proteaoccidentis**.

Another syn-exerge is obviously *INTERPOSITA*, Rothsch. (*l.c.*, XX., p. 115 and XXIV., pp. 100-101), which had struck its author as being "not only remarkable from its irregular and widely separated areas of occurrence, but also for its subspecific characters! For while the males resemble more nearly *mauretunica* and never approach very close to *deserticola*, the females are much nearer to *deserticola*, some being so close to the latter on the uppersurface that should the locality ticket be absent, only the examination of the underside can determine which are which; the heavier black markings of *deserticola* are at once apparent." The localities are: Batna, Lambessa, Oued Hamdon, the Northern Atlas Range in the Province of Oran (Seblon), the Kabylia (Djurjura) and the Aurès Mountains. Both this distribution and the looks of the insect are perfectly explained by realising it has been produced wherever *mauretunica* and *deserticola* have met and blended by crossings.

In a similar way, in Catalonia the race of Barcelona shows considerable affinity to *protea*, but there are differences between them, which brings it closer to the races of the Southern exerge of the rest of the Iberic Peninsular. The males are very similar indeed to those of *protea*, except that the wings are on an average a little more elongated and the black pattern is a little more extensive; they thus differ from those of the other Iberic races by their smaller size, deeper and redder fulvous on upperside, whilst it is less deep and red on underside, and by their more complete and uniform upperside pattern, lacking, as a rule, their characteristic prominent elbowed row of spots accompanied by obliteration of the inner submarginal one, whilst, on the contrary, the underside has the thinner pattern of *protea*. The females are smaller than those of *protea*, as compared with the size of the males; their aspect, compared with the extraordinarily variable *protea*, is very uniform indeed both as regards the various individuals and the different parts of the wings: the fulvous is constantly of the even, pale whitish fulvous, characteristic of the Iberic races; a more uniformly developed pattern than in the latter, with sharper outlines than in *protea*, stands out on it. I name **cataprotea** this emergence of May and the first days of June. In the same region there appears a second emergence from about July 10th to August 10th. Whether this can be the offspring of the former, and, thus, a second generation, I have no way of ascertaining, but by analogy with Italy, where the interval is too short for this to be possible, I am inclined to consider it the late

emergence of a bipartite I. generation. It differs from the preceding by its smaller size, lighter tone of fulvous, which in the female is quite whitish, and restricted black pattern. It corresponds with the form which is on the wing at the same season in Algeria, as figured by Oberthür in his *Études*, X., f. 2299-300, and named by me *occasus*, but it would not be possible to apply this name to it, because it is often larger, it is of a more vivid fulvous in the male, and more whitish in the female, and the proportion in the development of the various rows of spots is quite different and more variable, even resembling in some individuals the two specimens figured by Seitz on his pl. 66 under the name of *occidentalis*: **cataoccasus**. Finally in September there is a third emergence, which I consider, for the present, the real II. generation; it compares better with *dalmatina* than with *caldaria* by its minute size and by its dull ochreous colour, but the black spotting is considerably more pronounced in both sexes and in the females especially, some of which are quite like miniature *cataprotea*: **cataminuta** (co-types from Vallvidrera and La Garriga). I notice that a single specimen I have seen from Villamajor, of September 18th, is a *cataoccasus*.

I must also mention *SUPERCALDARIA*, Sagarra, collected from July 22nd to August 3rd at Santa Fé, at 1200m. on the Montseny, where Querci has had the impression no other generation can have preceded it, although it has the most unusual aspect for a single mountain generation, and *aabaca*, Frbst., I will presently describe from the mountains of Portugal, is the only other race which sustains this conclusion: *supercaldaria* is in fact very similar to *caldaria* in size and appearance, but its more elongated wings, its more yellowish tone of fulvous, its well-marked elbowed and submarginal rows of spots, whilst the inner submarginal is entirely obliterated and the marginal one is extremely thin or broken into dots, show clearly it is of Spanish origin; the blackish basal suffusion is very restricted, and even entirely obliterated in some females. Sagarra has not been wrong in saying it somewhat recalls *deserticola* and the black spots and streaks of the underside of all the wings, more pronounced than is ever the case in *caldaria*, point to a strain of the southern exurge too.

(To be continued.)

Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

XIV. THE QUANGU.

There is a small tributary of the Lungue Bungu called the Quangu; it flows in an easterly direction, rising from the watershed that separates the system of the Zambesi from that of the Cubango, which flows into the Atlantic in south Angola. The Quangu crosses the Munhango-Cangamba road about 25 kilometres south-west of the Lungue Bungu bridge where we had camped.

It is a pleasant little river, with a sandy, dry valley and a fair amount of game; as the country is uninhabited the game is not too shy, and we saw several oribi, reed-buck, duiker, and roan, the last a splendid animal big as a horse; it is the reed-buck, however, that gives the best meat. The stream rises out of a small saucer-shaped

bog near the top of the watershed, at an altitude well over 5000 ft. I was storm-bound here for a couple of days, as the rains have really set in now, but was able to do some collecting during the relatively fine intervals.

The boys, whose duties include the clearing of the ground for camp, felling and bringing of firewood and such jobs, come across a number of insects that I seldom or never see, for which I give them a trifling reward; when pitching camp, there is an assembly around me trying for *matabiche*, which is African-Portuguese for bakhsheesh; they sometimes bring me a nice earwig, such as the strange flattened *Apachys*, for which I have stripped countless trees of their bark in vain, or an odd-looking, buff Gryllacrid Locustid, with antennae four and a half inches long, or a big Pamphagid, which is always interesting, as it shows up that strange organ in the neck-membrane. As soon as I perceived the two tiny holes in the middle of the black and indigo spot, I looked for it in other groups: I have not failed to detect it in any Acridian grasshoppers that I have examined and was most interested to see it in the *Hetrodidae*, so probably it is common to all the saltatorial Orthoptera; it is easily overlooked as the neck membrane is shrivelled quickly in dry specimens, and even in fresh ones, the head must be pulled well forward, and then, under a strong lens, the two tiny holes on each side may be detected. But it seems that only in the *Pamphagidae* are they marked by a ring of brilliant coloration which has puzzled entomologists since the late Russian entomologist Porchinsky called attention to their presence in *Nocarodes*, a Caucasian genus, about forty years ago. I am not aware that any suggested explanation of these curious brilliant spots has been offered, nor that the fact that they mark the presence of an organ. What the nature of that organ is remains to be seen; perhaps olfactory; probably sensory in any case. And this is not the only organ in the Orthoptera that is scarcely known. Many years ago, the late Brunner von Wattenwyl called my attention to a microscopic spot in the sulcus of the posterior femora of grasshoppers, of which I have never read; his suggestion was that it might be connected with the control of the tibiae, which fit neatly into this sulcus.

This district seems rich in Mantids; these are mainly woodland insects, and when we were camped in the forest at Cohemba, they would fly to our table-light at night in some numbers, but in the more open country we seldom see them. There is a dusky, apterous fellow, recalling *Bolivaria* of the Western Asia steppes, that may be seen rapidly scuttling over the sand in places, and I suspect him of being one of the chief foes of the smaller grasshoppers. Up here I saw the first of a quite small, stumpy green Mantid; the only relief to the plain green colour is the prominently yellow dorsum of the abdomen, with two dark brown transverse lines. Mantids love a touch of colour, and one can usually find it hidden away somewhere; often it is on the underside of the raptorial legs, in which case it is probably intended to represent a flower; this is very noticeable in the eccentric *Empusidae*, or on the prosternum; the dingy fellow mentioned above has a bright reddish brown prosternum. I also got a very small Harpagid Mantid, green, with pointed eyes; his love of colour finds expression in brilliant scarlet wings, which are, of course, normally concealed by the green elytra; the dorsal surface of the abdomen is decorated

with an orange band cutting the segments, with a black spot on each side. The abdomen of these broader Mantids has a very Blattid look; after all, this is to be expected, as they as a group are more nearly related to the cockroaches than to the other Orthoptera.

One of the most interesting creatures here is a long-drawn-out, slender, almost cylindrical grasshopper, *Mesopsis* sp., with ensiform antennae and a knife-like appendage to the apex of the abdomen of the male; his normal colour is pale green, with a violet tinge often in the elytra and antennae; when he clings to a stem of green grass, he is almost invisible. But when the grass dries up under the winter sun, he is buff, often with minute black speckles. I saw the key to this one day when watching one settle on a grass stem; he did not match the shiny, smooth surface of the stem very well; he was too dull, had these black speckles, and, too, he substantially increased the diameter of the grass, and so could be found by looking for swellings on the grass. But I quickly noticed that each grass-stem has a number of swellings, where the sheath grows out at each knot and these sheaths are of a duller colour than the shiny stem, and are often covered with minute dark speckles; the business in life of this grasshopper, therefore, is to be mistaken, not for the stem of the grass, but for the loose sheath, and he does his work with remarkable efficiency.

All through the dry season we have seldom had any insect guests to our light at night; down on the Luena in May I used sometimes to take a small cockroach, a mole-cricket, or a Mantid, but now that the rains are on, they come in their thousands. Orthoptera are few and far between, usually represented by small Mantids; the chief visitors are small moths, mostly Crambids, I think, and numerous small Hymenoptera, with an occasional Hemipteron, which digs his beak sharply into your hand when you touch him, and a few clumsy beetles. There is one Hymenopteron whose body does not fit; he does not seem to be able to control it and is badly balanced; his favourite trick is to fall into the soup. The most troublesome is a dingy *Sphinx*; he looks like a *Smerinthus*, and is all grey, including the underwings. He has depraved tastes and a remarkable flair for alcohol; he likes chutney, too, and of course, sugar; his star turn is to fly into the candle with vigour and put it out. We often have half a dozen of these creatures bothering us at dinner and banging into our faces.

As yet there are not very many flowers out, but those that are, are beautiful; in the shaded parts of the forest there is a large, violet, mauve or purple flower, of the *Amaryllidaceae*, with a yellow stripe on the lip, growing straight out of the ground, without leaf or stem; and there are shrubs with waxy white star flowers and a marked and pleasant perfume, a kind of wild *Gardenia* perhaps. At one spot I saw a shrub like a bay, with scented flowers, and here for the first time I noticed a crowd of insects enjoying themselves; there were numerous beetles, contentedly busy with their domestic affairs, a dark green *Sphinx* sucking honey like a *Macroglossum*, and a number of butterflies; the commonest is a rather small bright yellow Pierid, with brown tips to his wings; all four wings are alike above and below; with him there is one that reminds me of our "Wall" butterfly, but paler; he is very and tame, numbers come flying around and sit on one's arms and furniture, but will not allow themselves to be caught by the hand; a more

elegant fellow is black and white like a *Limenitis*. Most striking and one of the most common, is the pale blue *Papilio* banded with black; he is so swift on the wing that he is difficult to catch, but may be picked up by the dozen when swarming at some spot of moisture in a bog. One afternoon, when sitting in camp, I heard a whirr of wings, and a greenish Hesperid settled on the arm of my chair; I watched him; he tucked the tip of his tail forward under his abdomen and deposited a drop of fluid; then he put out his proboscis and sucked it up with avidity; I could not catch him, as he was too nimble for me, but I should have liked to know his name. *De gustibus*, etc.

The boys brought me another unfamiliar Mantid, all green, semi-brachypterous female; I looked for the usual spot of colour and found a lilac prosternum and a blue-black spot on the under face of the femora.

On one tree, and among the broken branches lying on the ground, I saw great numbers of a big, fat, smooth green caterpillar, apparently a large *Dicranura*; the natives eagerly collected them all, and rolled them up in improvised baskets of bark. And that day at dinner time, I saw them sitting around a pot that was simmering on the fire; I looked in and saw the pot was full of these caterpillars, while the boys grinned as they eagerly awaited their luscious stew. *Dicranura* larva after all is a wholesome enough looking creature and a clean feeder, so we, who so enjoy scavenging Crustacea (and lobsters in Cornwall are said always to be fatter after a wreck) and live oysters, should not sneer at these poor savages, whose diet is so limited; my boys had had little but a kilo of manioc flour per day for several weeks, and carried a fifty pound load all day on that, so we must not grudge them their little luxuries. I had previously seen them treasuring a basket full of dried caterpillars coloured in yellow and black bands, decidedly aposematic in appearance; I must say, that if I were addicted to caterpillar-eating, I would prefer the somewhat luscious-looking, but more wholesome, *Dicranura* larvae.

In front of my camp at the head of the river were two little patches of dry bog where the grass had been burnt, as is so common in Africa. The fauna of these burnt patches was extremely interesting. It consisted chiefly of Orthoptera and the commonest insect was a small grasshopper, just like our familiar European *Stenobothrus* and very possibly allied to that large genus; as is commonly the case in that group, the tip of the abdomen was red, but the wings are colourless; the general coloration is almost black, the ordinary patterns characteristic of the group being more or less completely masked by the general blackish tint; they were, in fact, melanic, and adopted this dusky complexion the better to fit in with their surroundings, which consisted mainly of blackened and charred grass stems on a background of greyish sand.

But more striking were four species that were particularly specialised. The first of these is the *Mesopsis* mentioned above. Here it lives not among dried grass but among burnt grass, and incompletely burnt grass; the short stumps that were standing were not all black, but the sheath was usually charred, while the stem retained its buff colour; the specimens that I took were all black on the dorsal surface, from the tips of the antennae to the tips of the elytra and abdomen, but the flanks and underside were yellowish; consequently he could continue to indulge in his habit of clinging to the stems of grass and imitating

the sheath, to cover the increased diameter which his presence gave to the stem.

The next species is a Truxalid, but of the same general design, that is to say, with elongate, pointed head, pointed ensiform antennae, long narrow pointed elytra, and short legs. I was first attracted to him by a flash of brilliant orange, and found in my net to my surprise, a jet black grasshopper; he was quite black, unrelieved, all over; when he clings to a burnt piece of grass, he is quite hidden; the colour-relief is afforded by his wings, which are brilliant orange, with a black band; these, of course, are visible only during flight, and completely hidden by the black elytra when the creature is at rest.

This species has been very thorough in his melanism; but two relatives of his have been more artistic; these are both smaller, and, while the primitive colour is probably green, I have not yet found an all green one; the commonest coloration is the usual buff of the dry season, but sometimes there is a green dorsal stripe. But those that live among the burnt grass, where the tiger-like environment of the partially burnt grass in alternate stripes of buff and black is relieved by the numerous young shoots of tender green, all have the appearance of having been caught in the fire and had their extremities singed. The effect is simply astonishing; they are invisible when settled, yet have very little black on them; they are evidently two closely allied species, and at first I thought them two forms of one. But the antennae are different, and the surprising thing is that the form with longer antennae invariably has the wings smoky, often with a vague black fascia, and the singed portions are the *anterior* extremities, that is, the antennae, head and pronotum, sometimes only just the tips of the antennae, with a black blotch on the head or pronotum; the one with shorter antennae, however, always has the *posterior* extremities singed, that is, the tips of the elytra and abdomen and the hind legs. In both the legs seem to be often singed. What struck me in this was, if I may use the expression, the taste, the artistic skill, the restraint; the effect is exactly as though each insect has been individually singed in the fire, and to my mind this is more remarkable than the dead black coloration of the species mentioned above. This second species has the wings either brilliant orange or crimson, and so is quite conspicuous when it flies.

Another species that was characteristic, but not numerous, is a kind of *Oedaleus*; this genus is one of the *Oedipodidae*, which frequent hot dry places and assimilate well with their surroundings, but betray their presence by their brilliantly coloured wings; visitors to Switzerland are generally familiar with the crimson- and blue-winged species which are common in Central Europe. In *Oedaleus* the wings are bright yellow with a distinct black band; the general pattern of the body is green often marbled with whitish. Now on this burnt patch I found a number of larvae in various stages of growth, and these were all quite black; I caught but a single adult, and, though not quite black, he was so dusky that his characteristic pattern was almost completely masked. He does not sit among the grass, however, but on the bare sand, and there he looks like a bit of cinder; though his shape betrays him; but he is a vigorous flyer and is very difficult to catch, even with a butterfly-net; he relies rather upon his wings for escape than upon his resemblance to his surroundings.

(To be continued.)

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at Hodeslea, Meads, Eastbourne on June 1st, 1929. Mr. Robert Adkin in the chair. *Members* present in addition to the Chairman—Mr. Horace Donisthorpe, Mr. H. Willoughby Ellis, Mr. James E. Collin and W. J. Kaye. *Visitors*—Mr. F. W. Frohawk, Mr. R. A. Adkin, Dr. R. R. Armstrong, Dr. Malcolm Burr, Dr. J. Waterson, Mr. H. L. Rayward, Mr. G. C. Leman, Mr. E. C. Bedwell, Mr. W. Rait-Smith, Dr. J. M. Aldrich, Dr. K. Jordan, and Mr. N. D. Riley. Owing to family illness the Chairman's residence was only available for a portion of the entertainment of the guests. On Saturday June 1st, the members and guests met at the Grand Hotel to luncheon in a private room and in the afternoon in fine weather the party joined in a most enjoyable ramble on the Downs towards Beachy Head. The club members returned to Hodeslea at 5 o'clock for the business meeting of the Club. At 6.30 the Club Supper was held at the Grand Hotel in a private room during which Dr. Aldrich, Professor of Zoology, Washington, U.S.A., communicated an interesting note as follows—"Mr. J. M. Aldrich exhibited a specimen of the fly *Melanderia mandibulata*, Ald., which belongs to the family *Dolichopodidae* and is found on the ocean beach on the west coast of the United States near the mouth of the Columbia River. The fly is remarkable in possessing labial structures which resemble mandibles and are in fact mandibular in function being used to grasp and hold the prey. Since true mandibles are absent in the entire Dipterous order, the development of a substitute organ in this unique case emphasizes the law that a structure once lost in evolution cannot be regained." A most enjoyable evening was spent and those who did not remain for the week-end took trains to London and elsewhere. Those who were able to remain were accommodated at the Grand Hotel and on Sunday after breakfast a collecting trip was arranged to Whiteway Woods in rather dull weather and insects generally were found to be very scarce. Nests of *Bombus castrensis* and many other lepidopterous larvae were noted, amongst which one specimen only of *Limenitis sibilla* was seen in a shady part of the wood. These woods are privately owned and are becoming very much overgrown with small trees and shrubs, and as they are open to the public much damage appears to be done during holiday times and large quantities of wild flowers are wantonly gathered and wasted by the visitors. At one o'clock the cars left the wood for lunch at "Hodeslea," and a very pleasant time was spent in the host's garden where many flowers grow in profusion. At 7.30 dinner was provided at the Grand Hotel in the Dining Room after which the guests were entertained in the lounge where the orchestra played a selection of music during the evening. On Monday morning breakfast was provided at the Grand Hotel and the guests departed during the morning after a most successful and entertaining meeting.—H. WILLOUGHBY ELLIS.

A *List of the Micro-lepidoptera of the Oxford District* has just been published. It is compiled by Prof. E. G. R. Waters, M.A., F.E.S., mainly from his own records and experience, although no source of information has been neglected. There are a few pages of introductory matters as to the character of the area considered, the changes going on in the area, the various assistance given the author and the publica-

tions, diaries, etc., utilised. The classification used is that of Meyrick's "Revised Handbook of British Lepidoptera," and there are included no less than fifteen species not in the "Handbook," four of these are newly discovered, but there are "eleven which that work does not recognise as being specifically distinct." Exact localities are given with each species, often dates, and most have some item of life history, and the food-plant upon which the larvae were found or that the imago was frequenting. In the limited area 762 species have been definitely and indisputably recognised, while 30 others are given in an Appendix as excluded until further evidence of their occurrence be forthcoming. A large amount of information carefully arranged and, we personally know, most carefully sifted, has been got into the 72 pages of this little book, which cannot fail to be of the greatest assistance to students of the smaller fry, even beyond the 10 mile radius of Oxford, from which it was compiled.

We would like to call attention to the forthcoming Monograph on British Zoo- and Phyto-ecidia by Messrs. Bagnall, Bartlett and Harrison. Literature, either reprints of papers or records of plant galls, is urgently requested, as well as material for identification and description. Prof. J. W. Heslop Harrison, D.Sc., F.R.S., F.E.S., of the Armstrong College, Newcastle-on-Tyne, would be pleased to receive the above desiderata at any time.

In the *Irish Naturalist's Journal*, the Rev. Canon Foster relates that the last description of himself that he has heard was "Ah, poor creature, he spends his time running about the country at night catching flies." He says clerical attire is, of course, not readily seen at night, but by day it is respected by all classes and he finds it well to wear it among the mountains and bogs.

In the November number of the *Revue Zool. Agri. Bordeaux* is a long account of the immigration of *Pyrameis cardui* with a history of similar occurrences, particularly of that of 1879. Other notable immigrations were in 1906, 1913 and 1918. Notes on these occurrences are given with suggested causes of the invasions.

The *Entom. Tidskrift* for 1928 contains an Obituary of the greatest Swedish entomologist since the days of Linnaeus, Chr. Aurivillius, with an excellent portrait. The articles deal mainly with Coleoptera, with several articles on Diptera, Hemiptera, Trichoptera, etc. Only one article deals with Lepidoptera. Per Bernander continues his studies on the Microlepidoptera. He gives the food plant of some 40 species he has recently bred, with dates of feeding, pupation and emergence, and details of structure and a life-history of some half dozen species.

The *Int. Ent. Zeit.*, March 22nd, devotes an article to *Morpho laertes* and *M. hercules*, describing its habits in its native haunts, with six illustrations from photographs.

A *Revision of the North American species of Buprestid Beetles belonging to the Genus Agrilus* is another of those works which might be so useful if comparative descriptions were used. As it stands we have a volume of some 350 pages, indicative of an immense amount of work, but only occasionally do we get any indication of relationship and that of only the most meagre kind.

The *Mem. Soc. Ent. Italiana*, Vol. VI, fasc. II, contains a short Obituary of the great Italian Dipterist Mario Bezzi whose tragic death was recorded sometime ago. There is a characteristic portrait of him included.

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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. Hy. J. Turner, "Latemar," West Drive, Cheam.

Duplicates.—*S. Andrenaeformis*. Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woodhouse, Hill House, Frances Street, Chesham, Bucks.*

Duplicates.—Fine bred *primaria grossulariata* varieties and many other species.

Desiderata.—Ova of *truncata* and *citrata*.—*Rev. G. H. Reppner, The Lilies, Brampton, Huntingdon.*

Duplicates.—*Strangalia auralenta* (Col.). Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima*, *populeti*, *gracilis* (Irish and Scotch and Manx), *gothiceina* forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—*A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus* spp., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo- and Phytococcidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: *Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.*

Wanted loan of series of *E. jurtina* (unusual aberrations not required) from East Anglia, N. and S. Wales, Northern England, Scotland (E. and W. sides), and Connaught, for study of geographical variation.—*P. P. Graves, F.E.S., 5, Hereford Square, London, S.W.7.*

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MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 2nd and 16th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. June 27th. July 11th, and 25th.—*Hon. Sec., Stanley Edwards 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed:—*Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.*

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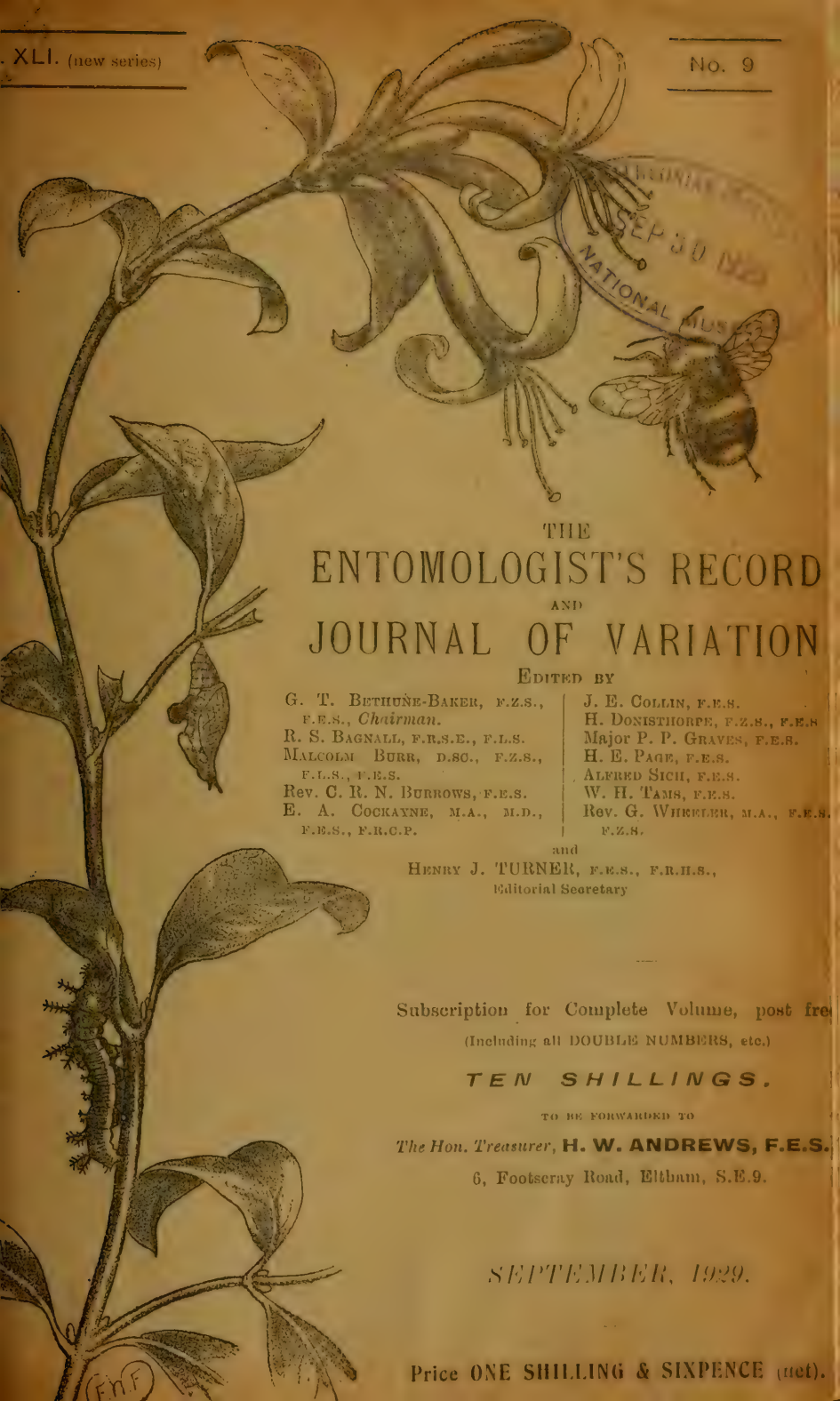
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Histeromerus mystacinus, Wesmael; a Coleopterous Parasite.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

On July 16th this year when digging out specimens of *Strangalia aurlenta*, F., from birch stumps in South Devon, I came across two pupae (which had practically emerged) in their cells. The cells were full of ♂♂ and ♀♀ of the above rare Braconid, the ♂♂ being much the less numerous, and the beetle pupae had been cleaned out. The dry head, thorax and breast with the antennae and legs only remaining. Nothing is known of the habits of the parasite, as far as I am aware, except that I took it under similar circumstances in a cell of *Leptura scutellata*, F., at Epping Forest on May the 1st, 1906. *H. mystacinus* would therefore appear to be a parasite on longicorn beetles.

Gymnetron lloydi, n.sp.; a species of Coleoptera New to Science.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.,

Black; tarsi and claws, base of scape, articulations of tibiae and femora clear red, joints of funiculus very dark red; clothed with thicker and finer yellow and white hairs and scales.

Rostrum long, slightly curved, rugously punctured, clothed with thick yellow and white hairs as far as the insertion of the antennae, which occurs about one third from the apex of the rostrum. Thorax transverse, broadest before base, sides strongly rounded, contracted before apex, with a ridge along the apical margin; somewhat coarsely and granulately punctured; clothed with thick yellow hairs and some thin white ones, the clothing being thicker at the sides, along the ridge, and especially just above the scutellum. Elytra oval, about twice as long as broad, evidently clothed with thick yellow and thinner white hairs; shoulders well marked; interstices flat and broad, rugosely but shallowly punctured; striae distinctly engraved. Legs clothed with thick white decumbent hairs, which are not very close together; anterior tibiae with a white fringe of fine hairs at apex. Underside clothed with thick white and yellow scales. Long. 3.5mm. including rostrum (about 2.8mm. without).

This extremely distinct species has the facies of a *Miarus*, but is a true *Gymnetron*, as the anterior coxae are contiguous, and the tarsal claws connate.

I have much pleasure in naming it in honour of Mr. C. Lloyd, the esteemed chief of the Crown Estate Office at Windsor.

On June 19th last I was sweeping some *Alliaria officinalis* by the side of a hedgerow in Windsor Forest, and bottled, as I thought, three specimens of *Ceuthorhynchus picitarsis*, Gyll., as they all looked alike in the net with their red tarsi, and the legs tucked up. I only discovered what a prize I had taken when I came to set them and found one of the three was not a *Ceuthorhynchus* at all, but the above fine insect. It is, of course, unlike anything we possess in Britain nor could I name it with any of the Continental literature. There is nothing like it in the general collection at the British Museum, and both Mr. G. K. Marshall and Colonel Deville to whom I submitted it, consider it to be a new species.

On going down again a few days later to try for more, I found that all the herbage unfortunately had been cut down. It was probably nearly over as the specimen is rather rubbed, and I am unable to do full justice to the beautiful clothing of the beetle.

Longitarsus nasturtii, F., v. obscura n.var., a variety of Halticinae (Coleoptera) new to Science.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

Head and thorax black bronze, sometimes with a greenish reflection, elytra dirty dark testaceous, side margins and suture blackish, the latter broadly so especially at the scutellum, the blackish sometimes extending to the shoulders and nearly the whole of the elytra: legs dirty testaceous, the hind femora and apex of tarsi black; the greater part of the first joint and last seven of the antennae blackish; sometimes the legs and antennae are nearly all black, underside and coxae black.

Head finely punctured and alutaceous. Thorax strongly and closely punctured and very strongly alutaceous. Elytra strongly but not so closely punctured as thorax, very distinctly alutaceous between the punctures. Shoulders oblique, sloping. Wings present, but short.

Male with the antennae slightly longer than in the female, the last ventral segment of abdomen having a hollow with a raised rim at apex, and a small tubercle above it. Long. 1.5-2.8mm.

This variety comes very close to *S. nasturtii*, F., but differs by being on the average a little larger and slightly more robust, darker in colour, with slightly more strongly and closely punctured elytra, short wings, rounded shoulders. *L. nasturtii* is found on *Symphytum*, *Anchusa*, *Cynoglossum*, and *Echium* (*Boraginaceae*).

Having discovered a large patch of *Symphytum officinale* (common Camfrey) in Windsor Forest I proceeded to sweep. The only beetle which occurred on it was the above variety of *Longitarsus*. It was present in great profusion, and was taken on this plant on June 19th, 28th, and July 3rd last.

Les Arachnides de France, by Eugène Simon. Vol. VI. Part 3.

By A. RANDELL JACKSON.

The late E. Simon, France's premier Arachnologist, published *Les Arachnides de France* originally from 1874 to 1881. The first five volumes treated of spiders, whilst volume vii. included Scorpions, Opiliones and Chelonethi. Volume vi., which was to have finished the spiders, never appeared, so that several families of this order were not dealt with. Many years afterwards the author decided to bring the whole subject of French spiders up to date in volume vi. which was to be issued in parts.

Of these he produced part i. in 1914.

Since his death in 1924, part ii. was produced by MM. L. Berland and L. Fage in 1926, and now in 1929 they have followed it by the production of part 3. There will probably be two more parts before volume vi. is complete. When all have appeared this volume will be a complete and self-contained book on the spiders of France with so

many notes on species found in the neighbouring countries that it will be practically a handbook to the spiders of north western Europe, and as such it will be absolutely indispensable to all British workers on this subject.

It is published by L. Mulo at 12, Rue Hautefeuille, Paris, the first part of volume vi. costing 12 francs, whilst parts 2 and 3 cost 25 francs each.

All the three parts are profusely illustrated with reproductions of drawings in the text, and there are numerous tables of the diagnoses of genera and species.

The illustrations chiefly consist of drawings of the sexual organs and are extremely valuable.

Part 3 which has just appeared is in my opinion the best up to date and completes the account of the *Argiopidae*. It contains the subfamilies *Linyphiinae*, *Tetragnathinae*, and *Argiopinae*. In these groups the author has not resorted to the splitting of genera nearly as much as he did in part 2 when dealing with the *Erigoninae*. Many of the genera created for this last group will I believe be shortlived. The *Linyphiinae* however, are divided into two natural groups by the structure of their sexual organs, and it is probably upon the characters drawn from this source, that the future classification of the whole family will have to be based.

A few new genera are created, but all these are convenient and some quite necessary.

The industry and erudition of M. Simon were enormous and one always wonders how he managed to amass such a vast amount of information. His books and papers on spiders are almost innumerable, whilst as a side line he was also an authority on Humming Birds. During his life nothing could exceed the kindness and help he showed to younger and less informed Arachnologists; all those who wrote to him were helped and instructed and had most of their difficulties smoothed away by his assistance. If the remaining part or parts of *Les Arachnides de France* are as good as those which preceded them, it is safe to say that volume vi. of this work will be the most important book on European spiders ever published.

The Asiatic origins of the Western Palaearctic Rhopalocera exemplified by *Melitaea didyma*, Esp.

By ROGER VERITY, M.D.

(Continued from page 118.)

THE SOUTHERN EXERGE, *CASTA OCCIDENTALIS*, KOLL.-STÖCKR. — I treat *casta* (= *persea*, auct.), *deserticola* and *occidentalis*, as a single exerge on account of their distribution, which makes it highly probable they should have similar constitutions, suited to the same sort of climates. It must be noted, however, that they are certainly much more distinct from each other than are the local races, which constitute the two other exerges. I cannot attempt to make out their origins, because it would need a larger amount of materials from Central Asia than I have at hand. To begin with there are in Persia two very distinct forms, and nobody has yet established whether they are the two generations of a single race or two races. One is the small *didyma*, which many have confused with *trivia* race *persea*, Koll., and to

which Staudinger no doubt applied the latter name, as he makes *dalmatina* (*avaratica*) a synonym of it. In fact the specimens I have from Askhabad and from Sharhud are, broadly speaking, of the same size and have the same general aspect as *avaratica*; they differ from it by the more complete and bolder black pattern of both surfaces and in both sexes; the female I have is of a duller and paler fulvous, which actually becomes of a dirty white in a row of little areas, between the nervures, across the disc and in the cell. The black spots of the underside are heavy and shaded in outline and thus recall those of *deserticola*, pointing to the fact they belong to the same Southern exerge, suited to particularly dry and hot localities. The other is the larger form, of which Seitz figures the two sexes very well on pl. 66, under the name of *persea*; I have specimens exactly like them and the British Mus. has received some from Southern Persia. It is noteworthy that there is a considerable resemblance between this race and *ala* in the shape of the wings and in the fact that the elbowed row of spots and all those of the basal half of the wing are very restricted and partly obliterated, whilst the marginal band and the submarginal spots stand out prominently. This is exactly the reverse of what characterises *deserticola* and the preceding small Persian race. It would be instructive to find out whether the larger race is not the representative of exerge or species *ala* in hot and parched regions. Concerning the names of these two races from Persia, Riley has lately pointed out that the name of *persea*, Koll., applies to a race of *trivia*, as Kirby, Rühl and Stauder had done, and that it is *casta*, Koll., which must replace it in *didyma*. We, however, unfortunately, have no clue as to which of the two races described above Kollar's *casta* belonged, unless it were found that only the large one exists in Southern Persia, whence he describes it; this is so improbable that one need not consider it. As a matter of fact the size of 15'''-17''' Kollar gives for *casta* against the 17''' of *persea* shows it is as small and smaller than Persian *trivia* and it must be the small race he had before him. Anyhow, if this were not considered a sufficient proof, his description would cover both races and we could equally well give a definite meaning to the name of *CASTA* by restricting it to the small race described above and naming the large race **magnacasta**: as holotype I label a female in my collection and Seitz's figures can be referred to as paratypes.

I must note that the name of *robertsi*, Butler, has hitherto quite wrongly been applied to a *didyma*, because his original figure clearly exhibits the characteristic of *trivia* in the position of the central row of black dots, just beyond the end of the cells on the underside of the hindwings. Apart from minor differences which may be observed and defined, so as to utilise these names, it seems to me, in a general way, there exists in *M. trivia* the following synonymy: race *persea*, Koll., 1848=*robertsi*, Btl., 1880=*catapelia*, Stmgr., 1886. Bingham's figure of *persea* on p. 453 of *Butt. of India*, Vol. I., is not a *didyma*, but a *trivia*, and shows its distinctive feature of underside very well, so that it is the real *persea*, Koll.

As to *DESERTICOLA*, Obth., we can suppose it is the distinct descendant of those *didyma* which were already acclimatised to a hot climate, so that, when the Hyrcanian isthmus opened the way westward, they rapidly spread on the southern side of the Eastern Mediter-

ranean and they have survived there the most hot and arid period, assuming their present local aspect and a constitution, which, with *abyssinica*, Obth., is apparently the most highly differentiated produced by this species, except *ala*, which may be a distinct species, like *saxatilis*, or a very highly differentiated exerge, as noted at page 40.

Rothschild (*l.c.*) has recorded from the Central Sahara (El Hadadra, Ghardaïa, etc.) a striking race, more extreme than *deserticola*, which he compares with *M. acraëna* on account of its pale sandy-yellow ground colour; in some females the black spotting, too, is as obliterated as in this species. He has named it *HARTERTI*.

According to the general way in which the westward migrations have, apparently, occurred, when the Miocene climate became cooler, also the Central exerge of *didyma* spread in this direction, in company with most of the Mediterranean species, and, after having populated Asia Minor and the Balkans, part of it passed the Greco-Tunisian isthmus and reached Morocco and Andalusia, whence at a later date, as described in my paper on *M. aurinia*, it pushed on to the rest of Spain. *Hesperia cinaræ*, *Nytha hippolyte*, *Zegris eupheme*, *Zygæna laeta* exerge *ignifera*, *Graellsia isabellæ* and other species are proofs of these migrations at different periods. During their long abode in North Africa and Andalusia the latter *didyma* have begun to repeat the same transformation as *deserticola* had undergone. Although they only exhibit its features to a slighter degree I think one is justified in including them in the same exerge, whereas we have seen that *mauretanica* and *occusus*, which have arrived in Algeria still later, with a third flow of species from the east, presumably belong to the Central exerge.

Leaving out *magnacasta*, Vrtý., whose position, we have seen, is open to discussion, the characteristics of the Africo-Iberic races, other than *mauretanica* and *occusus*, can be summarised as follows: The shape of the wings is quite as elongate and pointed as in the Northern exerge, so that it distinctly differs from that of the Central one of the rest of southern Europe; the fringes are the same as in the latter; the fulvous is of a duller, lighter and more ochreous tinge than in any European I. generation of the Central exerge and the sexes differ less from each other in this respect; curiously enough, on the underside both the forewing and the bands of the hindwing are of a richer tone than the upperside, whereas in the Central exerge it is just the reverse; the black basal suffusion has in the I. generation about the same average extent as in the latter; a marked feature is the prominence of the spots of the elbowed row, as compared with those of the other ones: the submarginal also has a tendency to be bolder, but less constantly than the former; on the contrary, the inner submarginal is, nearly invariably, entirely absent in the male and reduced to small roundish spots in the female; in this sex the outline of all the black markings is always sharp, so that they stand out on the light ground colour mentioned above and there never is any of the shading around the spots and on the nervures, which partially blends them together in many females of some races of the Central exerge (I have only seen one Iberic specimen with a partial shading of light greenish grey over the forewing, pointing to the aspect of Sicilian *meridionalis*; it is from Orihuela, 1700m., in Aragon; as this exceptional mountain form is worth recording, it will

be useful to name it ab. **hiberava**): on the underside of both sexes the markings are much thicker and blacker than in the Central exerge, so that this and the richer, redder fulvous produce a greater resemblance to the Northern exerge on that surface. In comparing Africo-Iberic series of specimens with those of other regions the impression one has at once is of extreme monotony, individually, seasonally and racially, and particularly of great uniformity in the clear ochreous tinge. No wonder, then, that Staudinger in the *Horae* (*l.c.*) makes a sweeping assertion: "by this character alone" (the greenish grey forewing of the female) *meridionalis* "differs essentially from the var. *occidentalis* of Western Europe, in which the females nearly invariably remain of a yellow-red (Gelbroth)." This is the first description of *occidentalis*, but the name had been perfectly valid since 1861 on the strength of the figures he refers one to in his Catalogue of that year. The last of these figures actually are those of *araratica* of Herrich-Schäffer, whose male he subsequently turns into *dalmatina* in 1871 and in 1901, separating the sexes. It is a good example of the fallacy of the easy method consisting in naming a single character and grouping one's specimens accordingly; it leads to splitting up racial and seasonal aggregates, which are natural, regardlessly of the more subtle features which show the real affinity of their components, and to lumping widely different individuals. This system has been universally condemned in general classification and the same must be done in dealing with minor variations. In the case of *occidentalis* the first figure quoted in 1861 is Hübner's male 869-70; it thus is the "type" and the name applies to all its features, especially as Staudinger himself subsequently restricted it in 1871 by eliminating the male of *araratica* and the second figure quoted of H.-S.'s female 133, which he transferred to *neera*. Now, what does Hübner's fig. 869-70 represent? In the *Ent. Rec.* of 1919, p. 180, I have suggested it is similar to *neera*, but now I possess fine series of *didyma* from the Albarracin Sierra, I see that some males are so exactly like that figure in every detail I can detect on both surfaces, that I have quite satisfied myself that Hübner's specimen was a Spanish one; and I agree with Rothschild, who had come to the same conclusion in *Noritates Zool.* XXIV., p. 100 (1917). This race resembles some Russian ones so closely, especially by the rich colour and the bold pattern of the underside, that Staudinger's mistake and mine are nearly justified. H.-S.'s fig. 133 is very similar indeed to some Albarracin females, except for the whitish colour of the basal half of the forewing, which contrasts with the fulvous of the outer half in a way I have never seen in Spain. Staudinger was no doubt right in transferring it to *neera*, for this reason and because I find, in looking over H.-S.'s text, that all the specimens, belonging, like this one, to the Kaden collection as stated at p. 26, are from Southern Russia and Asia Minor. We also have to consider the specimens labelled by Staudinger "*occidentalis*" in his own collection. Herr Bang-Haas kindly informs me they are from Montpellier and the Ardèche. It means they are *magnaestiva* and *marstilia-caldaria* and, so long as we only consider the vague "yellow-red" character, it is not surprising he should have included them under that name, just as much as *araratica* female, although, in reality, their ochreous colour and that of the latter are very different from the bright fulvous of Hübner's figure. What interests us, how-

ever, is that they cannot be considered as "types," because in 1861 the name was given to a figure and not to a description, so that the only "type" can be the specimen represented by the former.

I conclude that the name of *occidentalis* must be restricted to the largest and brightest Spanish race, such as the one collected by Querci from June 16th to July 20th at Albarracin, 1000m., and at Orihuela, 1700m., in Aragon. No II. generation was found either by him or by Zerny, and Querci maintains it is never produced on the tablelands of Central Spain, where the plains are already at an altitude of 1000m. Zerny remarks the Aragon race scarcely differs at all from that of Algeria and the Sierra de Alfacar, near Granada. I agree with him in regard to the Spanish races, except those of Catalonia, as all those I have seen could very well be included under the name of *occidentalis*, Stdgr.

There exists, however, also the name of *CASTILIANA* given by Melcón, in the *Bol. Soc. Espan. Hist. Nat.* of May, 1910, p. 219, to the *didyma* of Uclés, near Cuenca in New Castile, and rather than easily sink it in synonymy, as one has been too apt to do in the past with names which it gave one trouble to place correctly, I think one should utilise it to the advantage of greater precision. I notice the series collected by Querci, from the beginning of July to August 10th, in that region, at Huelamo and Villacabras, 1200m., are less varied than those of Albarracin and constantly keep to a smaller average size, to a slightly deeper and duller tone of fulvous and to a fuller black pattern including a thicker marginal streak. Now, it happens that Hübner does not even figure the average form of Albarracin, but the extreme individual variation which stands furthest from the Cuenca one: largest size, light, bright fulvous, black spots limited in extent, elbowed row lacking their usual Iberic prominence, marginal streak extremely thin (I have a specimen just like that figure, but in which it is actually reduced to internervular dots, as in *caldaria*). There thus is a use for the two names, to designate both individual and racial variation, as Melcón's description, based on comparison with *neera*, is suggestive of the form I have defined more exactly above. The Aragon females corresponding to Hübner's form are most remarkable and exactly resemble Seitz's figure of *pekinensis* in every detail of size, shape, colour and pattern. This seems noteworthy in connection with the origin of the southern exerge, considering other Africo-Iberic butterflies, such as *feisthamelii*, Dup., *cleobule*, Hüb., and probably *eramera* (Erseh.), Vrtz., have their nearest allies in China.

At sea-level in the Alemtejo province of Southern Portugal Querci has found in May a race which constantly keeps to Hübner's form, although not quite to its extreme degree, the spots of the elbowed and of the submarginal rows being a little more pronounced and the fulvous duller. At 1000m. in the Sierra da Estrela of Central Portugal he has collected, apparently without interruption from the middle of June to September 20th, a race of small size, which compares best to *super-caldaria*, but approaching less the *deserticola* aspect, so that it can be described as intermediate between the former and *occusus*, Vrtz., of Africa, in size, shape of wings, tone of colour and pattern; it is, however, so unusually variable for an Iberic race that some of my specimens actually are like H.-S.'s figure of male *aravatica*, with a very thin and partly obliterated pattern. Frühstorfer, in the *Soc. Entom.*

XXXII., p. 19, of April, 1917, names *AABACA* some females from Castile, collected by Korb, which he describes as "remarkable on account of their dull ochreous-yellow colour, resembling *arduinna* rather than any other *didyma*, and on account of the black pattern being, especially on the hindwing, still more obliterated, or reduced to minute streaks, than in *persea* and in *dalmatina*." I take them to belong to a race similar to the Estrella one and I apply that name to it, as they certainly were from the Sierra de Guadarrama, which is well known for its races produced by parched surroundings and very different from those, for instance, of the Cuenca region, where there exists *castiliana*.

Note: I must take this occasion to correct a mistaken statement I have made in the *Ent. Rec.*, XL., p. 163, concerning *M. phoebe*, Schiff. I see in Frübstorfer's paper that his race *guerara* of the latter is from the same locality as *aabaca* and that it corresponds with it by its small size, ochreous colour and thin black pattern, so that it is entirely distinct from the race of Cuenca, which I had compared with the Andalusian *bethune-bakeri*, Sagarra, and I had found to be like it. This name must thus stand for the handsome race of these two localities and of most Spanish ones, which is usually wrongly called *occitanica*, Stögr. I must also note that the name of *castiliana*, given by Turati to the *M. cinzia*, of Castile, in 1920, is unfortunately a primary homonym of Melcón's *didyma*. I replace it by that of: **carpetana**.

The *Eupithecia* common to Europe and N. America.

A useful and interesting article has been contributed to the *Can. Ent.* by J. McDunnough, "Synonymic Notes on Canadian *Eupithecia*," from which we have chosen to mention here the species which occur on both continents.

Eupithecia pygmaea:—*E. obumbrata*, Taylor. There is nothing in the genitalia of either sex to separate this from the European species, *E. pygmaea*.

E. castigata:—*E. latipennis*, Hulst. The genitalia are in every respect similar to those of the European species *E. castigata*.

E. albipunctata:—Canadian specimens agree exactly with European.

E. virgaureata: So far as the writer has investigated he is inclined to put *E. detcheri*, Taylor, as a N. American sub-species of *E. virgaureata*.

E. lariciata:—*E. bifasciata*, Dyar, *E. luteata*, Pack., *E. catskillata*, Pack., and *E. fasciata*, Taylor, are all the same species. The genitalia are very close to those of the European *E. lariciata*, but the writer's material is as yet insufficient to definitely refer.

E. assimidata:—*E. coagulata*, Gn., is probably the European species.

E. absinthiata:—*E. geminata*, Pack., is probably the European *E. absinthiata*. But in both species more material is needed for definite reference.

E. satyrata:—*E. dodata*, Tayl., *E. fumata*, Tayl., and *E. machieata*, Swett., have nothing to distinguish them from the European *E. satyrata*. Probably *E. youngata*, Tayl., also belongs here.

E. helveticaria.—*E. gibsonata*, Tayl., and *E. chagnoni* are the European *E. helveticaria*, of varied maculation.

E. innotata.—*E. cootenaiata*, Dyar., *E. alberta*, Tayl., *E. pennsylvanica*, Tayl. (part), *E. slovacata*, Tayl., and *E. winnata*, Tayl., are at the most nothing more than the European *E. innotata*.

E. sobrinata.—*E. interruptofasciata*, Pack., *E. niphadophilata*, Dyar., and *E. quebecata*, Tayl., are all the common European juniper feeding *E. sobrinata*.

In many cases the writer has been able to examine the genitalia of the actual American types.

Geographical Variation in Bees of the Genus *Megachile*.

By T. D. A. COCKERELL.

Megachile angarensis var. *confusans* v. nov.

♀. Disc of mesothorax with black hairs, forming a very broad band between the wings; the surrounding pale hair is more or less tinged with ochreous.

Ust-Balei, Siberia, July (Cockerell). This tends to connect *M. angarensis* with *M. analis*, Nyl., and it may be better to regard the different forms as races of a single species. So far as the pubescence of the head and thorax goes, this agrees with *M. analis*, sub-sp. *chionura*, Ckll., from the Maritime Province, but the recurrent nervures are equally distant from base and apex of second cubital cell, and the ventral scopa is as in *M. angarensis*. If we write the latter *M. analis* sub-sp. *angarensis*, the present form apparently ranks as a variety of the subspecies.

The geographical distribution of the leaf cutting bees (*Megachile*) presents many points of interest especially with regard to the local races or subspecies. It is a question how far these differences are the result of climatic conditions, and how far they may be due to mutations surviving under conditions of isolation. Even large collections, such as that in the British Museum, are inadequate for a thorough study of these problems. The following notes may be useful as far as they go:

M. sericans, Fonsc., of S. Europe has a race *caucasica*, Lepel., in the Caucasus, with the ventral scopa broadly black at sides, red only in the middle.

M. centuncularis, L., has a race *janssonii*, Algken in Norway, the mesonotum black haired, etc.

M. versicolor, Sm., has an Irish var. *hiberniae*, Perk., only sixth segment of scopa with black hairs; pale hair of metathorax and base of abdomen practically white. There is a closely related species (*M. semiplea*, Ckll.), in Madeira.

M. lapponica, Thoms., has two forms (*baicalica*, Ckll., and *kurbati*, Ckll.), at Lake Baical in Siberia.

M. melanopyga, Costa., has a distinct race (*amaguella*, Ckll.), on the Eastern Coast of Siberia.

M. circumcincta, Kirby, has a race (*lactescens*, Ckll.), from Lake Baical.

M. analis, Nyl., is discussed above. It extends right across the Palaearctic region, and runs into various races and varieties. A very melanic variation from Kiel is called *obscura*, Algken. It is also reported from Lapland.

M. lagopoda, L., has a distinct race (*seitziana*, Ckll.), in the Pyrenees.

M. willughbiella, Kirby, is interesting. In 1924 I described two forms (*kudiensis* and *prorecta*) from the East Coast of Siberia. In the following year Perkins described race *hibernica* from Ireland, close to *kudiensis* but more extreme. Thus the species nearly repeats itself at the opposite ends of the Palaearctic region.

M. lignisea, Kirby, has a race (*melanaspis*, Ckll.), on the East Coast of Siberia.

Hyères and Draguignan in April, 1928.

By LIEUT. E. B. ASHBY, F.E.S., F.Z.S.

Leaving London in the evening of April 5th I reached Hyères in schedule time on the morning of April 7th, amidst the mêlée of Easter traffic. After some rain followed by mistral I succeeded by April 11th, in getting a small series of *Thestor ballus*, all taken on the ground by the quarries at Costabelle, where Mr. Powell had indicated to me that I should find them. Their foodplant the localised *Lotus hispidus*, a low growing plant with trefoil leaves and small yellow flowers is still pretty abundant there, but the gradual extension of the quarries may in time limit this locality further. The insect at this date was still in fair condition, especially good in the female sex, but being really a March insect I had to release a fair proportion that I had taken. The insect is not difficult to catch, settling frequently on the paths and low growing plants in and about the quarries and somewhat resembles *Lumicia phlaeas* in some of its habits. I took little else up to the date mentioned except a few specimens of *Lycaenopsis argiolus*, *Callophrys rubi*, *Anthocharis belia*, and several bees; the last of which are much addicted to a tree in blossom on the main road between the railway and Costabelle, a species of pear, whose fruit, I am told, is used for crystallized fruit.

Both sexes of *Thestor ballus* are prone to settle on the blossoms of thyme during the hotter hours of the day, where they are found frequently in company with the imagines of *C. rubi*.

April 12th.—The mistral is blowing hard to-day under a strong sun and collecting is extremely difficult. At the quarries at Costabelle I took 4 more specimens of *Thestor ballus*, and single fresh specimens of *R. phlaeas*, *P. icarus*, *A. belia*, *Euchloe cardamines* (both sexes), *Erynnis alcae*; *Pontia daplidice* var. *bellidice*, *Glaucopsyche melanops* and *Scolitantides baton*. The nests of the larvae of the "Pine Processionary Moth" are visible on many of the pine trees. It is high time to secure the full-fed larvae now, as they have in many cases pupated by this date, and I have succeeded in securing a good batch. Two specimens of the beetle *Pentodon punctatum*, F., were a welcome addition to my catch to-day as well as the Hymenoptera *Odynerus callosus*, Thoms., *Ammophila hirsuta*, and *Anthophila sichelii*, Rad.

April 14th.—To-day I have continued to increase my series of *Thestor ballus* in its very limited habitat in and around the quarries at Costabelle. I have not seen it elsewhere as yet, though I searched behind the Castle Hill at Hyères in the direction of Mt. Fenouillet. Its foodplant was growing in patches behind the Castle Hill. During

this afternoon's ramble, I found some bees of the genus *Anthidium*, 2 specimens of *Andrena hessae*, Panz., and several bees of the genus *Anthophora*, especially *A. tarsata*, ♂s and ♀s, which were strongly attracted to the yellow flowers of *Genista linifolia*, L., growing up to 5 feet high very strongly amongst the chasms and isolated masses of rock on the slopes of Mt. Fenouillet to the west of Hyères. I also took the Bee *Eucera grisea*, F., and three specimens of *Odynerus callosus*, Thoms. On the way back to Hyères I captured a female of *Gryllus campestris* on a wall, also a specimen of the Rhyncotid *Carpocoris fuscispinus*, Bohm., and *Lygaeus pandurus*, Scop., together with the Coleoptera *Oxythorea stictica*, L., and *Lachnaca cylindrica*, Lacord., and the ant *Camponotus cruentatus*.

April 16th.—The mistral blew very hard under a warm sun and a cloudless sky. This morning at the quarries at Costabelle I took what is probably my last specimen of *Thestor ballus*, a female, slightly worn, together with some specimens of a small Bombyliid fly, *Bombylius venosus*, Mik., also the Hymenoptera *Ammophila hirsuta*, and *Osmia tricornis*, Latr.

This afternoon I collected on the high ground to the left of the Castle Hill, trying to seek sheltered spots to avoid the mistral. In one of these I caught an absolutely fresh specimen of *Zerynthia (Thais) polyxena* var. *cassandra*, together with a specimen of *A. helia* which is pretty common here and a bee of the genus *Osmia*. My bag at Hyères for the 10 days has only totalled to 103 set insects, owing to the poor collecting weather during my visit and to the still worse weather the district had in March.

April 17th.—I reached Draguignan at midday via Toulon and Les Arcs, and I am staying at the Hotel Bertin, which is well managed and comfortable. This afternoon I collected on the new Grasse road, along the terraces as far as the gully which is about 4 kilometres from Draguignan, as mentioned by Mr. Haig-Thomas in his excellent account of collecting Butterflies at Draguignan in the *Entomologist*, Vol. 60, July, 1927. I saw *Papilio podalirius*, and *Colias hyale* and *C. croceus* and I took single specimens of *Thais modesta* (female), *Euchloë euphenoides* (male) and *Pieris brassicae* var. *chariclea* just emerged; also a number of *S. baton* ♂s and ♀s. The mistral was blowing like a tornado and I was lucky to get what I did. I also took one specimen of the Hymenopteron *Odynerus callosus*, Thoms. The flowers of *Vinca acutiflora*, Best., are much in evidence both here and in the Hyères district; although not so deeply coloured as our *Vinca major* and *Vinca minor* found in the British Isles, this flower is very beautiful to my mind from the shape of the petals which give rise to its specific name.

April 18th.—This morning I caught the autobus which now leaves the railway station here every morning at 7.30 a.m., for Castellane and further. I got out at the village of Montferrat and walked up the 5 kilometres or so to the summit of the Pass in the direction towards Comps. At the end of my walk I found *Erebia epistyme* flying in fair numbers, some in good condition, on both sides of the road; careful selection had to be made at this late date for this insect. The butterfly settles frequently on a species of low growing dandelion, which is fairly abundant at that height. On the walk back down to Montferrat I took the Mayfly *Ephemera bioculata*, a male of *Thais*

medesicaste, a female of *Brenthis dia*, several quite fresh *C. rubi*, and the two beetles *Scarabaeus laticollis*, and *Leucosomus pedestris*, Poda. The autobus to Draguignan from Montferrat got me back about 2.0 p.m.

It was a great satisfaction to find there are no mosquitos at Draguignan, as I was terribly bitten by this pest by day and night during my whole stay at Hyères.

April 19th.—This morning I walked up the new road towards Grasse as far as the 4 kilometres or thereabouts and turning up the gully on the left was glad of the shade of the pines as the morning was very close. En route and in the gully I took two specimens of *Thais medesicaste* and discarded several that were worn; also single specimens of *E. euphenoides*, only males seen as yet, *Powellia sertorius* (sao), a large form; *Leptosia duponcheli*, which here as at Digne likes the blaze of the sun as distinct from its congener, *L. sinapis*, which always seems to prefer shady places. Probably *L. duponcheli* is not common here, as I never saw but this one specimen; *C. rubi*; *S. baton*; *G. melanops*; *C. hyale*, the neuropteran *Ascalaphus longicornis*, and the coleoptera *Harpalus caspius*, the 3-horned *Geotrupes typhoeus*, L., and *Leucosomus pedestris*, Poda, as well as several bees, amongst them *Anthidium sticticum*, F., which frequents hot spots along the winding roadside, a species which is new to me. A larva of the Hymenopteron *Trichocampus riminalis*, Fall., which I took produced the imago on May 5th, at Hounslow. *Anthophora pubescens* and *Messor barbara*, also occurred.

(To be concluded.)

New Forms of Lepidoptera..

In the April *Int. Ent. Zeit.* p. 7, G. Warnecke describes and figures a new aberration of *Nonagria geminipuncta* as ab. *jaeschkei*, from Kiel. It has forewings with a central transverse area margined by dark double lines both basally and outwardly.

M. Lhomme in *Am. Pap.* p. 206, reports that in more than one area in France there occurs a second generation of *Boarmia* (*Cleora*) *lichenaria*, the first emerging in the latter half of May and the second from the end of August to the end of September; the imagines of the latter brood are much smaller. In the department Lot there is a marked tendency to melanism in both broods, the median area in some cases being more or less darkened. A new form is described, ab. *chretieni*, in which the basal area of the forewing is almost entirely black except the basal spot. The terminal area is also black from inner margin to costa, but not quite uniformly. A strong black shade occurs also on the hindwing.

In the *Ent. Zeit.* XLIII. p. 21, T. Grüber names two further aberrations of *Colias croceus*, (1) ab. *myrmidioneformis*, ♀ specimens having very large yellow spots in the outer margin of all the wings, the forewing with 7-8 spots. (2) ab. ♀ *obsoleta*, with the spots reduced almost to obsolescence—a transition form to ab. *powelli*, Aign.

In the *Int. Ent. Zeit.* January 15th, H. Reiss names a new form of *Zygaena purpuralis* from the Swabian Alp as ab. *nigra*. It is wholly black. He also names a thinner scaled and paler red form of *Z. loniceræ* from Ussur in the far East as *ussuriensis*. The forewing

spots 3, 4 and 5 are round, 3 is very nearly as large as 4 and 5. The spots are clearly defined and not run together on the underside. The black of the margin of the hindwings is not so deep a black as in the typical form.

In the *Int. Ent. Zeit.* March 8th, Dr. F. Heydemann describes two new forms of *Anarta myrtili*. (1) ab. *mediosanguinea*, in which the whole of the central area of the forewings including the white middle spots is tinted bright and uniform blood-red. (2) f. *sulphureseens*, shows all the red and olive-yellow replaced by sulphur-yellow, and the forewings are black as in the typical form well strewn with sulphur-yellow scales; which in the basal area becomes pale golden yellow. The writer points out that the British and German specimens are the race *rufescens*, Tutt., the nominotypical form being the grey-black Swedish race. He also describes two new forms of *Feltia (Agrotis) vestigialis*. (1) ab. *violascens*, in which the innermargin and marginal area, but particularly the costa of the forewings, are coloured bright violet-rose on a pale brown ground. (2) ab. *pseudochretieni*, a form characterised by the complete absence of the orbicular stigmata. Figures are given of all four aberrations.

In the *Int. Ent. Zt.* for March 15th, a new form of *Brenthis selene* is described and named *futura* by Th. Reuss. It was bred among a brood from near Berlin. By close examination the correspondent found "homoeosis" on the underside, in which the brown black-spotted underside of the forewings assumes the colour of the hindwing underside. There are two figures.

The southern alpine race of *Comacla senex*, characterised by a deeper dusky-brown ground colour, in which the discal spot both of the forewing and of the hindwing appears large and strong, more striking than is the case with specimens of central Europe. It has been named *tramontana*, Dnbl. *Ent. Zeit.* XLII. 314 (1929).

Dannehl, *Ent. Zeit.* XLII. 314, describes ab. *insolata*, of *Oronotus quadra*, in which the dark streaks at the base of the costa, which in normal examples shine strongly blue-green, are wholly wanting. In the same article is described the form *desaburrata* of *Pelosis muscerda*, in which there is a reduction and diminution of the spotmarkings; the inner two or three spots which lie on the margin between the basal and central area are absent, and only quite fine remnants of the outer ones are present.

F. Derenne in *Lambillonia*, p. 34, names the form of *Diarrisia (Spilosoma) menthastri*, in which the spot marking is reduced to one small black dot near the costa on the forewing, as ab. *unipuncta*. It also has the smoky costal area characteristic of the ab. *costa-nigra*, Lamb.

In the *Mitt. Münch. Ent. Gesell.* for January, Fritz Wagner describes the subsp. of *Melitaea athalia* occurring in Anatolia as subsp. *anatolica*. It is chiefly characterised by the almost complete absence on the upper side of the marginal markings on all the wings which thus have a broad black border. The forewing underside is also much darker with almost complete absence of the yellowish portions at the apex and along the marginal areas.

In *Lamb*, p. 66, M. H. Debauche describes the following new aberrations. (1) *Aylais urticae* ab. *flavofasciata*, in which the yellow apical spot of the hindwings is prolonged to the angle, thus forming a

yellow fascia; near Charleroi. (2) *Anarta myrtilli* ab. *ochrea*, in which the forewings are yellow ochre with the black markings strongly developed. Beyond the white discoidal spot, the median area has several white spots. Cortenberg. (3) *Cabera pusaria* ab. *linearia*, with the antemedian and median lines wholly wanting, the postmedian line alone being present and well marked on all four wings.

Larval Description from the Argentine.

By CAPT. K. J. HAYWARD, F.E.S., F.R.G.S.

DESCRIPTION OF THE LARVA AND PUPA OF *PROTOPARCE SEXTA* SUBSP. *PAPHUS*, CRAM.

Length 90mm.

Colour pea green, rather darker on the head and beneath, covered with pale greenish-white round specks, more heavily on the dorsal and upper lateral area, the whole covered with fine grey hairs noticeable only against the light.

On the first seven abdominal segments a diagonal white stripe running back from the margin, edged upwardly with a thin black line, and merging below into the spiracles. On the seventh segment the stripe is extended (without black shading) across the eighth segment as far as the base of the horn.

Spiracle on first thoracic deep purple on a ringed white spot, spiracles on the first seven abdominal segments large, deep purple on a white ground which is edged with plum red, in some cases almost red, on the eighth abdominal purple on a light buff oval which is ringed with a dark-edged white circle.

Horn, mauve shading to plum at the tip, about 10mm. in length, back-curved.

Forelegs ivory-white ringed with black, claspers green, the pad nearly black.

Described from various larvae received from Villa Ocampo, Prov. of Santa Fé, Argentine, November 19th, 1928.

Foodplant tomato. (*Lycopersicum esculentum*).

Pupated November 21st. Emerged between ten and eleven p.m., December 12th and 13th.

Pupa-obtecta 54mm. long, light brown, tongue case making considerable loop and fastened at its extremity to pupa in angle formed by termination of antennae. Metathorax with callosity in form of raised sharp edge or ridge of darker colour. Markings coarsely punctate. Fifth, sixth, and seventh abdominal segments with raised darker ridges laterally, the spiracle being amongst these ridges. Anal segment terminating in a sharp flattish projection 1.5mm. in length and projecting from upper portion of the segment, bearing very small cremaster.

Imagines sent to British Museum under number 7608 and empty pupae cases under number 7609.

CURRENT NOTES AND SHORT NOTICES.

In the *Ent. News* for May there is "An Orthopterist's Point of View as to the value of Specific and Racial (Subspecific) Names and the Uselessness of those for Varieties and Forms." The writer says,

"Mendelian factors, which rarely occur in their pure form in nature, can not logically be used as a basis for specific or subspecific names; exemplifying, as they do, but a single tendency of the variational complex of the organism." "The usefulness of taxonomic names in zoology is to designate what appear to be definite steps in the evolutionary development of the organisms under consideration. By definite steps we mean those stages which shew a degree of completion and stability sufficient to distinguish them one from another, excluding features of difference within themselves which are individual, sporadic, or occasional, or which represent merely some single manifestation of the complexity of the organism."

The *Ent. Rundschau* for May has an account of the Lepidopterous fauna of the Balearic Isles by C. F. Frings and an article on the genus *Stalactis* by Dr. A. Seitz.

To the pages of *Ent. Zeit.* Herr H. Stauder has been contributing a series of notes on "New and rare *Zygæna* forms from Italy." To the naming of the forms of the various polymorphic species of this genus there seems no end. The May number contains notices of several new hybrids (1) *punctachilleæ*, (2) *punctumiloti*, (3) *meliloresticta* (*meliloti* \times *achilleæ* ssp. *restricæ*), (4) *melilotilipendulæ*, (5) *achililipendulæ* and *melilochsenheimeri*. The informative names can be commended.

OBITUARY.

The Rev. Gilbert Henry Raynor, M.A.

In Mr. Raynor we have lost one of our very oldest Entomologists. Born in 1854, he was educated at Brentwood Grammar School, and latterly at Tonbridge, where he became "Head boy." Thence he proceeded in 1872 to S. John's College, Cambridge, taking his B.A. in 1876 (2nd Class Classical Tripos), and M.A. 1879.

His first published entomological observations appear to have been contributed to *The Entomologist* in 1870, when he was 16 years old, but he evidently interested himself in the subject much earlier. The long list of subscribers to that Magazine, contains 233 names, all the bearers of which appear to have predeceased him.

In 1876, he went in search of health to Australia, where he was engaged in Scholastic work, returning to England in 1880. In 1881 he was Classical master at King's School, Ely. His three years residence here accounts for his intimate knowledge of the Fen, and Breck-Sand, districts, and their plant, and insect Fauna.

In 1884 he migrated to Brentwood Grammar School, this time as assistant Classical Master, and was also ordained to the Curacy of Shenfield, which parish practically surrounds Brentwood.

It was in the same year that I myself settled down at Brentwood, and can still remember my astonishment and pleasure, when I met a "brother of the net." Our friendship then commenced was lifelong. I have therefore to regret one of my oldest friends, and companions, to whom I could appeal for advice and information, in matters entomological.

It would appear that in this year also, we made the acquaintance of J. W. Tutt, who came down to see us, and talk over his plans and ideas. Tutt may be considered at that date to be beginning his public scientific career. I find from the "Tutt Bibliography" (*Ent. Rev.*

1911, p. 140), the first item to be, from the *Entomologist* of June 1st, 1884. It was then that he commenced to produce that tremendous stream of entomological writing, which he carried on until his death, and which necessitated the production, in 1890, of a new Magazine *The Entomologist's Record* (to give it its shorter, and more usual title).

To this Magazine Raynor gave his hearty support, and was for many years a regular contributor, one of the many, urged by Tutt's personality, to give of their best observations.

I mentioned above that I believed Raynor's interest in entomology was from his childhood, I have seen a Home, or School, Magazine, produced by the brothers, containing a very passable wood cut of a specimen of *Melanchra conspiciellaris*, found by the brothers, upon a gate post in the Hazeleigh district.

Raynor was markedly a close observer, and excelled in detecting and rearing the so-called Micros, as well as the larger Lepidoptera. The beautiful setting of his specimens, as well as his insistence upon perfect condition will be recognised by all who are fortunate enough to possess examples. He will however, in this connection, be best remembered by his devotion to the study of the possibilities of variation in one particular species, namely, *Abraxas grossulariata*. For many years he made this his chief interest, and by systematic breeding, secured such forms as had never before been seen, I believe he was attracted by the discovery of the intricacies of the Mendelian Law and based his experimental work thereupon. At one time he would appear to have been working in consultation with Messrs. Onslowe and Doncaster, of Cambridge. I do not recall the number of years he carried on these observations, but I possess a specimen of *A. var. lacticolor*, which is dated 1901, and may be his original specimen. Next in my series stands a beautiful individual of the same form, larger and better marked, labelled 1904, and I believe this to have been the offspring of the other. One cannot help feeling sorry that he appears not to have kept records of these interesting, and instructive experiments. I understand that this race, tended through so many years, is now extinct.

Incidentally he evolved, in order to avoid the disappointments which most breeders of lepidoptera have to face, a very hygienic condition for saving his larvae from disease. He rejected absolutely the old fashioned use of permanent cages, and substituted for these, practically new boxes for each brood. The usual more or less elaborate, cage, was replaced by the simplest form of tie-box, just a cardboard box and glass lid with sufficient ventilation, and clean sand on the floor. Careful attention to clean quarters, and abundant clean food, produced the magnificent specimens which connect with his name. Mr. Raynor occupied the family benefice of Hazeleigh, Maldon, Essex, from 1896-1921, when he retired from pastoral responsibilities, and spent the remaining years of his life at Brampton, Huntingdon.

He passed away after a short, and one hopes, painless illness, on August 8th, 1929, and was buried at Brampton.

All of his friends and correspondents will join with me in offering sincere sympathy to Mrs. Raynor, who survives him.—C.R.N.B.

CORRECTION :—On p. 123 ante, line 21 from the bottom, for *castrensis* read *neustria*.

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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should
be sent to Mr. Hy. J. TURNER, "Latemar," West Drive, Chesham.

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—J. W. Woolhouse, Hill
House, Frances Street, Chesham, Bucks.

Desiderata.—URGENTLY REQUIRED. Wants records of *Corixidae* (Hemiptera).—H. P.
Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.

Duplicates.—*Strangalia auralenta* (Col.), Tenthredinidae and Aenictus.

Desiderata.—Species of *Dolerine* and *Nematine* sawflies not in my collection; list
sent.—R. C. L. Perkins, 4, Thurlstone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. *Opima populeti*, *gracilis* (Irish and Scotch and
Manx), gothicina forms of gothica and selected unusual forms of *inerta*, *gracilis* and
munda.—A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.

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illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong
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MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7.
8 p.m. October 2nd and 15th.

The South London Entomological and Natural History Society, Hibernian
Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.
September 26th. October 9th.—Hon. Sec., Stanley Edwards 15, St. German's Place,
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List of British Geometers
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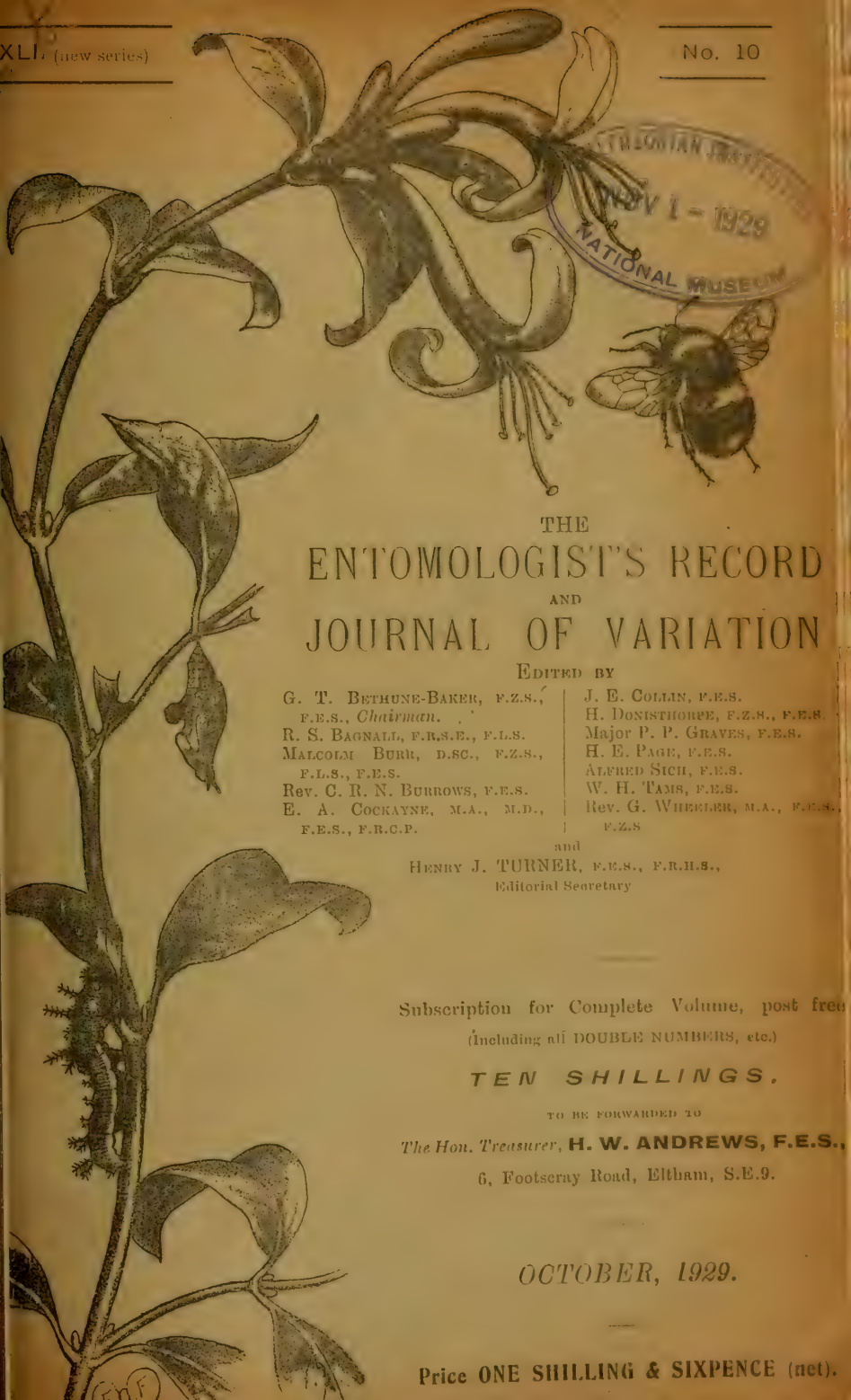
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Field Notes from Angola.

By MALCOLM BURR, D.Sc., F.E.S.

XIV. THE QUANGU. (Continued from p. 122.)

I found a black Mantid, the species recalling *Bolivaria*, active and spidery, nimbly scuttling over the sand, but the other denizens of the burnt patch were not so characteristic: an *Acrotylus* was there with orange wings, but he is a regular sand-loving species. There were several *Acrida*, some with yellow wings, others with yellow wings banded with black, just as is *Orotatus*, and some with wings brilliant orange-red: these quaint creatures have the elongate form characteristic of the savannah fauna, but are not really well hidden: they are very conspicuous when they move with their brilliant wings and clattering flight, and when they settle, usually on the ground but among the grass, the practised eye can quickly detect their outline: the normal colour is green or buff, according to circumstances, but one species has the elytra marked with a well-defined series of dark and pale spots.

The smaller grasshoppers, including our *Stenobothrus*, do not hide themselves so specially from their enemies. When they see danger, which they quickly do with their big goggle-eyes, they resort to one of three tactics: generally they fly off and settle out of range, and repeat the process when followed up. Or else they hop off to another blade, in which case they always settle on the far side and keep the blade between themselves and their enemy: if the danger approaches, then they often sidle down the blade backwards and hide among the roots, or creep away among the tangled jungle. This latter habit is very effective in Africa where the grass does not grow in a solid carpet as with us, but in tufts: these tufts mingle towards their tops, but are separate at the base and so a series of avenues is formed, covered in by the gothic arch of the long grass meeting overhead. When a grasshopper slithers down to the roots, therefore, he has an open passage way and a big choice of direction, and he is so active that he quickly disappears along one of these avenues. If the collector is quick, he may pounce down and press the grass down on to the insect, which is thus held in position and may be picked up with the fingers.

A very unpleasant-looking creature is sometimes found crawling on the short herbage. He is one of the *Pyrgomorphidae* and indulges in the family liking for brilliant colours, but his are garish and conspicuous. He is a great, fat, crawling creature, like a great slug: his colours are greyish, black, orange and scarlet, in contrast: the scarlet is in spots, the orange in bands and the main background blackish. He is incapable of flight, the elytra being reduced to the merest flaps. So unpleasant and so conspicuous a creature must be decidedly aposomatic, and, indeed, he filled me with aversion: the horriest part about him is that he is *soft*, like a slug. I have taken several, but the first was like a great cushion. It was obviously necessary to clean and stuff such a fat thing and when I opened him, a huge mass of green slime came out, which reminded me of the famous bulletin on the autopsy of the brain of a notorious person, where green slime was found instead of grey matter. I felt I should never relish spinnach again. I have frequently to clean and stuff big fat Orthoptera, but none so unpleasant as this horrid fellow. The big Pamphagid

females, for instance, contain a great amount of insides, but they are not disgusting, and the skin is a hard shell; they are clean to handle, like a lobster. The oddest inside I have come across is that of the dusky Mantid referred to above; it is of a brilliant turquoise blue.

The boys have brought me some more interesting things, including an adult *Saga* of the big kind, though much inferior to our European species, and several of a big spidery Dolichopodid, like our cave-loving *Dolichopoda* of the Mediterranean area, only with quite large elytra.

A question that has been occupying me for some time is, what are the chief enemies against which these grasshoppers seek to protect themselves with their marvellous adaptation? I have not been able to observe a single definite instance of any creature capturing or eating one. I have not seen any birds hunting on the ground. The chief birds here that appear to be hawking insects are the swallows, of which there are two or three species, the bee-eaters, of which there are three or four species here, and small hawks, and once swifts, but all these hunt on the wing. True, in the long grass of the bogs there are a good many small birds, but these seem to be mostly if not all of the hard-billed type, and mainly vegetarians. In Europe, where grasshoppers are very numerous, they have many enemies among birds. The glareole is a big consumer, and as they occur in vast swarms in the steppes of Western Asia, the destruction they do among the Acridian grasshoppers must be immense. My friend P. S. Nazaroff tells me that he has often counted twenty in the crop of a glareole, and that you find hardly anything else, and they fill their crops about three times a day, so if a single bird will consume some five dozen a day, the consumption of a nesting family must be immense. Curlews and wimbrels, too, are very fond of them, and Mr. Nazaroff tells me that in Russia the great bustard, MacQueen's bustard and the little bustard devour immense quantities, as do the smaller hawks, as the kestrel, merlin and hobby. But the specialist on Acridians is the rose-coloured pastor which devours such great quantities of locusts that he enjoys, or at least used to enjoy, the special protection of the Russian Imperial Government.

I am very much inclined to think, though I have, as yet, no evidence to offer, that the Mantids are serious consumers of grasshoppers, especially during the younger stages. And when a grasshopper is in the teneral stage just after changing its skin, it is so soft that it is helpless and can in fact scarcely move and in this condition would fall an easy prey, and also probably be a more tender morsel. Large Hymenoptera are very numerous here and I saw one hawking close to the ground on the burnt patch; he was a striking creature, big and powerful, of orange colour with iridescent purple wings and I feel that he was looking for grasshoppers.

Acrida has a curious trick of sticking up his long hind legs in a prominent manner when settled, which gives him a spidery appearance. Most grasshoppers keep their legs close to the body, either in a horizontal plane, when they are not noticeable, or in a vertical plane. A related species, grey or buff in colour, that is common among grass and shrubs, sits with its hind legs akimbo; it is but feebly protected, and quite easily seen; and if it cannot deceive the eye of a mere man, even if that eye be trained, it can hardly take in the trained eye of its natural enemy when looking for a dinner. The other Truxalids as a

rule do not seem to have this habit, but it crops up in some of that curious family the *Eumastacidae*. One species, *Poedes cruciformis*, was named by Bolivar from its observed habit of sitting with its hind legs at right angles to the body, thus assuming the outline of a cross, when seen from above. I have seen the same thing in the related genus *Penichrotes*, and it is to be seen, to a less marked extent, in *Thericles*.

Larval Descriptions from the Argentine.

By Capt. K. J. HAYWARD, F.E.S., F.R.G.S.

THE LARVA OF PHOLUS LABRUSCAE, L.; a Spthingid.

Length 108mm., width of 3rd thoracic segment 23mm., height of same 18mm. Width of abdominal segments 15mm. Height of same 16mm. at second and 14mm. at sixth. Penultimate segment 18mm. wide and 16mm. high.

Head small, ochreous brown, shiny, with an inverted yellow V terminating on either side with an upcurved mark.

Thoracic segments tapering towards the enlarged third segment, the head and first two segments withdrawn into the folds of this segment when disturbed. The dorsal area of the thoracic segments smokey brown with a central dorsal line black on the first and half second, white on the remainder as far as $\frac{3}{4}$ third thoracic where it terminates. The darker dorsal area bordered by blackish lines diverging outwards to back of second thoracic, continuing on the same line to $\frac{1}{2}$ third thoracic and there cut off sharp commencing again from the same darker area about one millimetre nearer the central stripe and again diverging outwards to the end of the segment. Forward on the dorsal area of the third thoracic two suffused chocolate brown spots, and a pair of much less distinct similar areas in the second half of the dorsal colouring. The forward fold of the third segment yellowish. The lateral area of the first and second thoracic segments divided into three more or less equal strips of light smokey brown, dark blackish brown, and the lower area white, the colour somewhat uneven and mottled in each case.

The lateral area of the third segment which as shown by the measurements given above is very large, is greyish above with a darker uneven area below covered with tiny black ringed greyish blue spots, and roughly divided into four areas, the first black edged anteriorly with the ground colour, and a white border, the second rather darker than the ground colour, the third a small white spot on the ground colour ringed with black and again with yellow, the fourth area heavily shaded with black. Below this series of patches is a white area covered with irregular blue grey spots edged with darker grey and and closely resembling scales. Dorsal area of the abdominal segments brown edged with a darker brown line, this line being sharply angular running obliquely outwards from the fold for about 2mm. then narrowing sharply 1mm. on either side, again runs out obliquely for 1mm. to narrow again and then runs out obliquely and gradually straightens off till it reaches the fold, the enclosed colour somewhat grey at the posterior end of each segment. A wide lateral area suffused with grey and extending anteriorly obliquely downwards, the entire remaining lateral area as also the underside smokey grey. On the

penultimate segment a large spot, pinkish brown, edged with white containing centrally a black spot on a brown ground edged with chocolate brown and including on this brown space a curious process consisting of a twin round area of about one and a half to one and threequarters of a square millimetre in area composed of a highly polished hard black substance the two discs set very slightly at an angle with one another and so arranged that when the larva oscillates this area by muscular action, these discs reflect the light in the same manner as a glass held to the sun, or a heliograph, so that the caterpillar appears to be flashing a light from its tail. The lateral spiracles are yellow, edged with dark red. The anterior portion of the third thoracic segment and all the remainder of the abdominal parts above and beneath covered with a series of short whitish dashes, each rather less than a millimetre long, set somewhat obliquely in rings around the body about 1mm. apart, the alternate rings staggered.* These short dashes give the larva the appearance of being scaled.

Described from a larva found at Villa Ana, December 20th, 1925, and revised from various other specimens found at later dates. Food-plant, Vine.

The whole appearance of this larva is reminiscent of certain poisonous snakes, and the natives refuse to touch it. With its head drawn back it is certainly a somewhat repulsive sight.

In *Trans. Ent. Soc. Lond.* 1925, Parts III. and IV. pages 575 575 et seq., there is a description of an undetermined *Prepona* larva from British Guiana that bears a similar light reflecting (or possibly refracting) process. (Pattern in four caterpillars from British Guiana. Maud D. Haviland), and Prof. Poulton in an appendix to this paper adds further examples.

[Burmeister in *Descr. Rép. Argent.* V. 347 and *l.c. Atlas.* p. 36, gives general descriptions of the larva as also do Roth. and Jord. *Sphing.* I. 497. Burmeister gives a fig. of a young larva on plt. XV, and refers to the excellent fig. on plt. XXXIV of Madam Merian's *Surinam*.—Hy.J.T.]

Stray notes on Erebiid species.—The names given by L. de Prunner.

By B. C. S. WARREN, F.E.S.

During the past few years, in the course of an exhaustive survey of all that has been published on the species of the genus *Erebia*, nothing has been more surprising than the unanimity with which practically all writers, past and present, ignore the the work of Leonardo de Prunner.

In the year 1798 de Prunner's "*Lepidoptera Pedemontana*" was published, and in it he describes no less than seven species of *Erebia*, for five of which his names have priority. Of the other two, one, his *P. medon* (= *gorge : erynis*, Esp.) has priority over Esper's name but falls as a primary homonym to *P. medon*, Linn. (*Amoen. Acad.* VI.

* "Staggered" is an engineering term. "To arrange in zigzag order, or in positions alternating on the one side and the other of a median line." Oxford Dictionary.—E.B.P.

p. 402, 1763) ; and the other, *petrosus*, is merely the male of the insect he had previously described as *pluto*.

One would have thought that the evident connection between Esper's work and de Prunner's, would have kept the latter in the public eye ; but, partly perhaps because the work was not illustrated, and partly because of de Prunner's rather curious methods of description his names were left on one side, or if mentioned it was generally only to question their validity. There can, however, be no doubt that they conform to all that is required to constitute valid names ; and the descriptions on the whole are not at all as uncertain as many of later origin. The following points must of course be remembered when reading his descriptions ; he refers to the upperside of the insect as the "outside," and the underside as the "inside" ; the forewings as the "posterior" and the hindwings as the "superior" or "first" wings. Keeping these points in mind there is little or no difficulty in identifying the species he was applying his names to.

His five names which will have to be adopted, on the strength of priority, are :—*pluto*, *triarius*, *albercanus*, *melans* and *montanus*. We will just briefly note the alterations which the re-instatement of these names will cause in the nomenclature at present in use.

1. *Pluto*.—This name has been connected with *alecto* by Kirby, and substituted for *glacialis* by Verity, and used as the *cavellia* form of *manto* by several other writers. There can, however, be no doubt that the insect de Prunner was describing was the ♀ of the black form of *glacialis* from the South-West Alps which Oberthür named *duponcheli*, while *petrosus* de Prunner, as already mentioned, is the male of the same species. That these two names apply to the same species is clearly shown by the following facts. In each description de Prunner states that the sexes are identical, which is synonymous with stating that he was only describing one sex in each case, for there is no European species of *Erebia* in which the two sexes are coloured alike, or even have the markings equally developed, also each description coincides with the respective sex of the species perfectly. That the entirely black *petrosus* is not, as was asserted by Rowland-Brown, the black Pyrenean form of *manto* (which does not occur in Piedmont at all) is shown by de Prunner's note at the end of his supplement (Supp. p. 77), where he states that *pluto* and *petrosus* must be looked for on the mountain summits, at even higher levels than such species as *lappona* and *tyndarus*, an altitude never attained by any form of *manto*. I may add that Mr. L. G. Higgins, who has studied de Prunner's work closely, came to the same conclusion respecting these two names quite independently of myself.

It is interesting to note that Esper used the name *pluto* for the same species, though he applied it to the male and, like de Prunner, used another name (*tisiphone*) for the other sex. Esper's name has been quite incorrectly used for the black aberration of *glacialis*, Esp., which occurs more or less racially throughout the Swiss Alps, and aberrationally in the *alecto* subspecies of the Austrian Alps. These aberrations are quite distinct from the insect of the south-western Alps. This mistaken use of the name is entirely due to the failure to recognise that the black race of the Maritime, Cottian and Graian Alps is a very different insect from any of the other races of *glacialis* ; so different indeed that there is much more ground for separating it

as a species distinct from *glacialis* than there is for separating the latter from *alecto* which has frequently been suggested. The *pluto* (*duponcheli*) subspecies differs structurally in more than one way from all other forms of the species, but at the present I feel they are all best retained as one species. I do not propose to go into the structural details here, this would require extensive illustration and could not adequately be dealt with apart from all the other forms of the species (these details will I hope be published in full in due course) but I may note, as the point has been mentioned, that I have entirely failed to corroborate Fruhstorfer's statement that the genitalia in *glacialis* and *alecto* show specific distinctions; and in this the genitalia do not stand alone, other structural details giving an equally strong assurance that the two are forms of the same species.

Pluto of de Prunner will then in future stand as the specific name, having priority over all other names given to the species, excepting *morio* of Giorna 1891. This, however, falls as a primary homonym to *P. morio*, Scopoli, *Ent. Carn.* 1763. The adoption of de Prunner's name would, by itself, cause very little alteration in the present use, but very unfortunately a regrettable change is necessitated by the fact that Esper's familiar name *glacialis* falls as a primary homonym to *P. glacialis*, v. Moll, (Moll, in Schrank and Moll, *Nat. Briefe*, Oesterreich, I. 1785) which = *OF. aello*, Hb., which will fall. All that can be done is to mitigate the enforced change as much as possible, by introducing a name which will keep this well-known butterfly still more or less under the name so long attached to it, for this is one of the very rare cases in the nomenclature of the Erebiid species, where there is no available synonym. I therefore propose the name **glaciale**, nov. pro *glacialis*, Esp.

The black forms of the Swiss and Austrian Alps, previously mentioned as being incorrectly alluded to as *pluto*, Esp., are produced in a racial manner in many localities in the Swiss Alps. Fruhstorfer was the first to recognise this fact, and he described this variation under the name *anteborus*; he failed, however, to note that it is never developed independently of *glacialis*, but always occurs with the latter into which it passes by imperceptible degrees, never more than a low percentage of even the males being entirely black on the upperside (for of course they are never so on the underside) and the great majority being intermediate and showing a varying amount of mahogany banding.

Fruhstorfer's *anteborus* is then a racial form of the Swiss subspecies and the name cannot also be used for the black aberrations found with so many of the Austrian and Tirolean subspecies. These had best be called ab. **plutonius** nov. pro *pluto*, Esp.

The nomenclature of the species, so far as these changes are concerned works out as follows:—

E. pluto, de Prunner, 1798. (= *morio*, Giorna 1791; *petrosus*, de Prunner 1798; *pluto*, Esp. nec. de Prunner 1803; *tisiphone*, Esp. 1803; *alecto*, Boisd. and Dup. 1832; *duponcheli*, Obth. 1897; *plutonides*, Frhst. 1918.)

ab. *pupillata*, Riel. (Maritime, Cottian, Graian Alps, and Gran Sasso).

ssp. *glaciale*, Warren. (= *glacialis*, Esp. 1803)

race et ab. *anteborus*, Frhst. (Pennine to Rhætian Alps).

ssp. *velocissima*, Frhst. 1918. (= *stelviana*, Schwa. 1911).

ab. *eutaenia*, Schwa. 1911. (= *aeolia*, Frhst. 1918).

ab. *aretoides*, Hirschk. (Ortler Alps).

ssp. *alecto*, Hb. 1801. (= *biocellata*, Vrbt. 1917 ; *teriola* Schwa. 1923).

ab. *plutonius*, Warren. (North Tirol Limestone Range,) etc., etc.

2. *Triarius*.—Under this name de Prunner described the species we know as *erias*, God., in a quite unmistakable manner. The adoption of *triarius* as the specific name will cause little or no change in the present nomenclature, beyond the possible sinking of one of Fruhstorfer's subspecific names. *Erias* will continue to stand as the race of the Pyrenees, these mountains being cited in the original description as the habitat of the species. This seems to have been overlooked, for it is usually stated that the type *erias* came from south-east France. The nomenclature of the species therefore will be :—

E. triarius, de Prunner, 1798. Exilles.

ssp. *erias*, God. 1823. Hautes Pyrénées. (= *pronoe* var. *pyrenaica*, Stg. 1871 ; *erias* var. *pyrenaica*, Stg. 1901 ; *ottonis*, Frhst. 1909.)

3. *Alberganus*.—Mr. L. G. Higgins suggested to me, somewhat doubtfully, that the species de Prunner was describing under this name must be *melampus*, Fuessl., as the specimens of *ceto* from the Maritime Alps did not seem to correspond with de Prunner's description. With this I fully agreed, but the fact that de Prunner earlier in his work cites *melampus*, Fuessl. under *melampus*, Esp. (i.e., *epiphron cassiope*) made it more than questionable that he was redescribing the former which he probably did not distinguish from the latter. This left the identity of *alberganus* rather uncertain, until I recollected the oft-described form of *ceto* found at Lautaret, which has attracted the attention of Tutt, Chapman, Fruhstorfer and others in the past, on account of its resemblance to *melampus*. A comparison of the insect with de Prunner's description at once settled the question. The description might have been (very possibly was) taken from a Lautaret specimen. De Prunner gives no exact locality, but the range of *alberganus* is not confined to Lautaret, for Mr. Higgins tells me he found a small form of *ceto* on the Col de Sestrières this summer, which agrees tolerably with Fruhstorfer's description of his *trenus* from Lautaret. Fruhstorfer's description was by no means perfect, so Mr. Higgin's specimens may very well agree better with Lautaret specimens than the description of *frenus*.

The only change the adoption of *alberganus* as a specific name will cause is that *frenus* will fall ; *ceto*, Hb. still will cover the ordinary forms of the species.

4. *Meolans*.—The description accompanying this name can only suggest *stygne*, Ochs., the details given in respect of the underside of the hindwing being particularly characteristic of the male of this species. De Prunner insists somewhat markedly on the presence in his specimens of four black spots with white pupils on both the upper and underside of all wings. This four-spotted form is of course common enough in many races of *stygne* from widely separated localities ; but it is always rare to find the four spots present on the underside of the forewings, even when strongly marked on the upperside, so that it is probable that this feature is not usually present in the *meolans* race

either, but is more aberrational. It seems most likely that *cubæ*, Frhst. may fall to *meolans*, and possibly one or two other races from more northerly localities also; *stygne*, Ochs. will not be affected, being a three-spotted form. Lack of material prevents me at the moment from giving more exact details on these points.

5. *Montanus*.—This name has long been recognised as covering *goante*, Esp. Staudinger noted it with a query as to its validity, and Fruhstorfer applies it to the race of *goante* taken by him at Courmayeur, but at the same time retains *goante* as the specific name! *Montanus* of Piedmont, widely distributed from the Graian Alps to the Mediterranean, is a slightly smaller form than *goante*, Esp., with narrower bands and smaller spots, which are often wanting on the upperside of the hindwings, though not always. (This fact is probably the reason why de Prunner in his description only mentions the underside of the hindwings).

Montanus has been described and named *valderensis* by Verity. In some localities such as La Grave, etc., both *montanus* and *goante* occur together, but the former is probably more universally distributed in the Piedmont. *Scoea*, Hb., is no doubt the same form as *montanus*; though his figure is not very typical of it, still the bands are shown decidedly narrower than in Swiss *goante*. His statement in the text, that *goante*, Esp., "seems to be" the same insect (not "is") and that Herr Lang had received specimens in 1790 from "von Prunner" from Turin, and had distributed them under the name of *scoea*: seems conclusive. *Goante*, Esp., will therefore still be used, though not of course as the specific name, *scoea* and *valderensis* will fall.

In conclusion, I would remind those who think this article too fragmentary and lacking in detail, that it must only be regarded in the light of an abstract; I would also recommend all interested in systematic entomology to get de Prunner's book if they can do so, for it probably contains (in proportion to its size) a greater number of original descriptions than any other work. The copy which I obtained after considerable trouble, was still in the plain paper cover it left the printer's hands in, and (symbolic of the neglect it has suffered) the pages were still uncut—131 years after publication.*

A note on *Hesperia alveus* race *warrenensis*, Verity.

By B. C. S. WARREN, F.E.S.

In a recent number of the *Bull. Soc. ent. of France*, Dr. Verity finally clears up the confusion which has covered Oberthür's race *ryffelenensis* of *H. alveus* since the time that name was published. Oberthür was himself the cause of this confusion. I have pointed out in my Monograph on the *Hesperiidi* that Oberthür's figures (*Lep. Comp.* Vol. IV. pl. LIV. figs. 470, 471) did not represent the insect which he forwarded to Dr. Reverdin for anatomical examination under the name of *ryffelenensis*. I thought his description corresponded with the latter specimens, but Dr. Verity has sent me a copy of the original description which shows that he described the Zermatt specimens he

* [My copy of de Prunner's work was bound in boards but absolutely unused.—Hy.J.T.]

figured. On this point I was misled by Oberthür's subsequent remarks in his Vol. VII., and notes of Reverdin's which I took to be Oberthür's. The latter evidently failed to recognise that he had two very different insects in his collection under one name. On the strength of Oberthür's Larche specimens, which I figured (*Monog. Hesp.* pl. XLIII., figs. 1-4), I stated that my specimens from Eastern Switzerland were *ryffelensis*; these I figured too (*i.e.*, figs. 5-8). As however, Oberthür's original description applies to his own figures 470 and 471, and not to the Larche specimens he sent out as *ryffelensis*, the name *ryffelensis*, as Dr. Verity points out, falls to a very universal mountain aberration which has already been named by more than one writer, *i.e.*, race et ab. *scandinavicus*, Strand. Dr. Verity referred this to the ab. *alticola*, Rebel, but Strand's own remarks on the connection of his types of *scandinavicus* with Swiss specimens from the Albula leave no question that he was naming this form, which is common in all mountain localities as well as in Scandinavia. (See *Monog. Hesp.* p. 122).

To put the matter in order then, it is only necessary to insert the name *warrenensis* on page 120 of my monograph in place of *ryffelensis* as everything I wrote on *ryffelensis* refers to Dr. Verity's new race: and to add *ryffelensis* to the synonyms of *scandinavicus* on page 122. The localities given for *ryffelensis* on page 121 will need a little alteration, for *warrenensis* has so far only been found at Larche and in Eastern Switzerland, the Zermatt records all refer to *scandinavicus*. Dr. Verity tells me that he did not select any particular figure of mine as the type of his new race, so I take the very beautiful little ♂ from the Alp Scharmoir, above Lenzerheide, which is figured in my monograph on Pl. XLIII. figs. 5 and 6, as the type.

Dr. Verity asks that I would take this opportunity of correcting another mistake in my monograph. I have there placed his *alveus* race *grandis* as *foulquieri*. His types of *grandis* came from St. Martin Vésubie and I have never seen anything like them from that district, where an ordinary mountain form of *alveus* seems to be widely distributed; *foulquieri* also is common there. He now tells me that dissection has proved his specimens to be *alveus*. This settles the point, but there can be no doubt that the small form of *alveus* is the ordinary one at St. Martin, judging from the numerous collections made there by different collectors, and such large specimens as *grandis* can only occur quite occasionally, in fact more aberrationally than racially. Dr. Verity complains that my work has made him publish a useless synonym, for he has since given another name to *grandis*, which of course falls now that the latter is applied to *alveus* again. I am sorry for having led him to do so, but it seems to me that I am not altogether responsible for this regrettable occurrence, for if he had waited until his dissections were completed it would have been avoided. In conclusion I may point out that he has published another synonym in his article which I began by referring to (*Bull. Soc. ent. France* 1928, p. 140) without any help from me, by substituting *microcarthami* for my *pyrenaica* for the Pyrenean race of *carthami*. The rule concerning primary homonyms is a very useful one, but there is no good in only applying half a rule. The rule refers only to subspecies, and the fact that there happens to be an ab. *pyrenaica*, Tutt, of another species in the genus in no way invalidates my race *pyrenaica*.

Hyères and Draguignan in April, 1928.

By LIEUT. E. B. ASHBY, F.E.S., F.Z.S.

(Concluded from p. 136.)

April 20th.—This morning I again took the autobus to Montferrat, but being a little wiser this time I went on until I reached the sign post, on much higher ground than Montferrat, which shows the road on the right towards Bargemon. Getting out here I walked on down the hill on this side road for about half a mile until the marshy meadows indicated by Mr. Haig-Thomas were reached. I found no *Melitaea parthenie* on the wing to-day nor later amongst the white Narcissus flowers, which grow here in abundance, but the sun was not strong until 11.30 a.m. Then I got two fine *Zerynthia* (*Thais*) *polyxena* var. *cassandra*, male and female, as they were settled on the coarse grass by the riverside. They were in perfect condition, doubtless I should have taken more but I had to rejoin the bus for Draguignan, which passes the sign post about 12.30, and there is no later bus. This really means that it is much better to hire an auto for yourself at Draguignan to work this locality thoroughly for a whole day. During the morning I took *Colias hyale* ♂; *Leptosis sinapis* ♂s; the bee *Eucera longicornis*; 2 *Bibio marci*, flies; the moth *Heterogynis pennella*, and *Glaucopsyche melanops*; and two specimens of *Rhynchota Lygaeus saxatilis*, Scop. I reached Draguignan about 2.0 p.m. and walked up the new Grasse road for about 3 kilometres. I took *G. melanops*; a pair of *Euchlœa euphenoides* in cōp; and more specimens of the Bee *Anthidium sticticum*, which is fairly common along the terraces and generally settles on the ground.

April 21st.—This morning I took an early train to Le Muy to visit the gorges of the Val d'Argens. I got practically nothing on the path alongside the Argens river, a penalty for taking the river path from Le Muy station which I afterwards found to be entirely the wrong route. All I got were four specimens of the dragon fly *Gomphus vulgatissimus*, and a *Cimber lutea*, L. As I approached a smaller stream some way on which runs into the Argens river, I took two good specimens of var. *cassandra*, and one *Euchlœa ausonia* (*belia*). Fresh *Melitaea cinxia*, were flying occasionally in the pastures adjoining the river path. That was all of interest besides a few fresh *Plebeius medon* (*astrarche*). Crossing the stream mentioned above and the railway and the road, I approached again the banks of the stream in the hopes of getting more var. *cassandra*, and after making friends with a peasant proprietor, I walked along the border of his wood and shortly came to a marsh embracing three fields near the same stream. In these fields *cassandra* was flying freely and continued to do so up to 4.0 p.m. when I left, having made a selection of the best, as some were quite worn. It is evidently a very good spot for the species a little earlier in the year.

April 22nd.—This morning I ascended the new Grasse road for about 4 kilometres and then turned up the gulley on the left, which leads right up into the hills. I got little except the *Anthidium* bees, *A. sticticum*, F., the bee *Eucera longicornis*; a few beetles, and some specimens of *Rumicia phlaeas*. I obtained the larva of *Otenichneumon castigator*, Fab., which produced a male insect on May 22nd, 1928, at

Hounslow. I also found the larvae of *Aporia crataegi* nearly full fed on *Prunus spinosa*, which produced a few imagines after my return home. It came on to rain hard about 3.0 p.m. as I was on the way back. The collecting grounds about Draguignan are, it seems to me best worked by taking one's lunch with one, instead of trying to go out twice and entailing much useless walking.

April 23rd.—To Chateau Double by the autobus from Draguignan Station, but unfortunately the sun went in and the rain came in torrents, and that was the end of it, but I secured two Theclid larvae and a larva on *Prunus spinosa* in the early hours of the morning there, also the beetles *Cardiophorus biguttatus*, Oliv. and *Gynandrophthalina nigritaris*, Lacord., with the Dipteron *Bibio marci*.

April 24th.—To the Gorges de l'Argens from Le Muy station. I found the right direction this morning and that is to walk through Le Muy village, and leaving it by means of the Route du Golfe, one reaches in about 15 minutes the bridge over the Argens River. Immediately after passing over the bridge, there is an indicated path to the right which leads along the gorge, affording an excellent collecting ground after proceeding some distance. To-day I took two fine *N. (Thais) medesicaste*, *Scolitantides orion*, just beginning to emerge, *L. sinapis*, *E. euphenoides*, *E. ausonia*, *Pararge aegeria*, *M. cinxia*. Many hibernated butterflies were flying; I also took the moth *Hemaris tityus (bombylififormis)*, Esp. at the blossoms of *Salvia pratense*, a rather small specimen of *Athalia glabricollis*, Thomson; the black bee *Andrena morio*; and the bees *Anthidium sticticum*, F., and *Anthophora tarsata*, Spinola; other Hymenoptera included *Arge cyanocrocea*, Forster; *Dolerus pilustris*, Klug.; and *Macrophya annulata*, Geoff.; the Rhynchota I took were *Eurygaster austriacus*, Schk.; *Lygaeus saratilis*, Scop.; and *Tricophora intermedia*, Kew; and the Dipteron *Bombylius pullens*, Mg.

It was quite hot in the narrower parts of the gorge path, and the day was perfectly fine throughout.

April 26th.—Above Mt. Ferrat and via the road towards Bargemon, I took 3 more var. *cassandra* in nice condition; and the moths *Fidonia plummistaria* and *Heterogynis pennella*, together with several *L. sinapis* and *G. melanops*. There was no sign of *M. parthenic* amongst the white narcissi. To-day on the new Grasse road from Draguignan and up the 4 kilometre gully I took *Hesperia sertorius (sao)*, *Polygonommatus thetis (bellargus)* male, *P. thersites* male, *G. melanops*, and several larvae of *Aglais urticae* about to pupate on walls near the town. I also took the bees *Eucera longicornis* and a female specimen of *Eucera clypeatus*, Erichs., with the larva of *Banchus pictus*, Fab., which produced the male Ichneumon fly at Hounslow on June 20th. Amongst the Coleoptera taken were several specimens of *Eosoma lusitanica*, which is pretty abundant; *Arima marginata*, *Leucosomus pedestris*, Poda, and a specimen of the Ant *Camponotus cruentatus*, L.

April 27th.—The weather was stormy throughout and I was able to do nothing but gather quite a number of full-fed larvae of *A. urticae* from the walls of the town. On the new Grasse road, where I walked for two kilometres, I took in short fine intervals several *Scolitantides baton*, the first male *Glaucopsyche cyllarus* I have seen here, and the beetle *Mecaspis alternans*, Ol., and another specimen of the ant *Camponotus cruentatus*, L.

April 28th.—I went again to Le Muy and walked up the Gorges de

l'Argens for some distance. The day was stormy and the sun only shone fitfully. Two more fresh *L. orion*; *Z. medesicaste*, and the Ichneumon flies *Amblyteles uniguttatus* ♀, and *Cryptus obscurus* ♂ (determined by Mr. Morley), and the Dipteron *Merodon flaripes*, Fabr.; a specimen of *Allantus dahlia*, Klug.; one of *Strongygaster singulatus*; the bee *Anthophora tarsata*, Spinola; the Rhynchotid *Carpocoris fuscispinus*, Bohm; and the Beetle *Tricodes alvearius*, Fabr., were the most interesting items in a moderate day's bag. The pretty beetle *Anthaxia hungarica* was fairly abundant, and I took also one specimen of the beetle *Silpha laevigata*, F., as well as another specimen of the ant *Camponotus cruentatus*, L.

April 29th.—Rain throughout the day. I managed to secure three specimens of the Rhynchotid *Lygaeus saratalis*, Scop., and the beetles *Agelastica alni*, L., and *Leucosomus pedestris*, Poda, with the Bee *Chelostoma incertus*, Perlé.

April 30th.—The last morning was again dull. Yesterday and this morning I gathered some more larvae of *A. urticae* from the walls of the town. These obligingly pupated almost at once in my larval receptacles. And so for London.

New Forms of Lepidoptera.

M. Meier Ramel in *Bull. Soc. ent Fr.* 174 (1929), names a form of *Melanargia pherusa*, which he has obtained from Sicily recently and which has a still more simple scheme of marking than in the well-known form *plesaura* described and figured in 1860 by Bellier de la Chavignerie in *Ann. Soc. ent Fr.* p. 678, pl. 12, figs 1 and 2. This general decrease in marking is signified by the name bestowed, ab. *reducta*. The author takes the opportunity to recall the various named forms of the species. The type figure of *pherusa*, Bdv., has four ocelli on the hindwing. In the *Lep. Rund.* 109 (1928) Stauder has named the form with more than three ocelli wanting in the hindwing as *semiplesaura*. The form with a sixth ocellus developed on both upper- and underside of the hindwings he has named *completissima*. Another form in which the white-centered spot at the end of the cell has become completely black he has named *discinigra*. And still another in which a bunch of black scales is present near the apex of the forewing is called *apicinigra*.

In *Ent. Zeit.* XLIII. 84, Herr Kraut points out that the form of *Colias croceus* (edusa) ♀ in which the yellow spots on the black marginal band are wanting has been named thrice. In this country we have followed Tutt, who in 1896, *Brit. Butt.*, p. 259, called the ♀s "with spots in margin almost or quite obsolete," ab. *obsoleta*. In 1901, Aigner, *Rovartani Lapok*, called it *páreli* (not *poreli*). It had, however, already in 1889 in the *Entomologist* been named *pseudomas* by Cockerell, by which name it must henceforth be known. At the same time Herr Kraut records a form of *C. croceus* ♀ having this obsolescence on the hindwings only. This he calls ab. ♀ *postero-pseudomas*.

In *Lambill.*, p 74 (1829) M. Derenne calls attention to the form of *Papilio hospiton* in which the yellow lunules of the hindwings have orange spots in them, a form corresponding to that of *P. machaon*

named *rufopunctata* by Wheeler. The same aberrational name has been applied in this case by Dr. Mezgar, ab. *rufopunctata*.

On page 74 of the same magazine M. Derenne names a new aberration of *Parastichtis monoglypha* as ab. *inversa*. The forewings are of a uniform brilliant black as far as the elbowed line and in this black one can perceive the extra-basal line marked with a deeper black; the subterminal space is white with black sagittate marks; the subterminal line with very well-marked angles forms an M which is here formed in black. The lower wings are of a blackish grey, with their ends black and fringes clearer. The reniform spot of the upperwings is well-marked, white crossed by a slight vertical, black mark; the orbicular occurs as a white outline. Captured at Spa in 1928, by M. Herment.

In 1776 Fabricius described and named a Satyrid *hiera* in *Genera Ins.*, p. 262, basing it on the figures in Schaeff. *Icones*. I., pl. 58, figs. 2-3, undoubtedly illustrations of the German (Ratisbon) form of what we know as *Pararge maera*. In 1799 Hübner figured an undoubted example of what we know as *Pararge hiera* and not a *maera* at all. In 1816 Ochsenheimer established the distinctness of this from *maera* and adopted Hübner's wrongly applied name for it. With these facts the name *hiera* is at present wrongly applied and as Dr. Verity points out, *Bull. Soc. ent. Fr.* 186 (1929), we must apply one of its racial names as a substitute, and suggests that *ominata*, Krulikowsky, be substituted, while *hiera* must revert to the form of *maera* figured by Schaeffer.

NOTES ON COLLECTING, etc.

NONAGRIA SPARGANII IN NORFOLK.—Since I do not think *Nonagria sparganii* has been recorded from Norfolk before, perhaps the following note may interest you.

From a Typha and Sparganium reed-bed on the north banks of the Waveney, my friends Messrs. Moore and Doughty, brought back a number of pupae, from which one *N. sparganii* emerged. I visited the locality myself on September 19th and also obtained one *N. sparganii* pupa, which emerged on September 23rd. I also observed one empty pupa case.—E. P. WILTSHIRE, Gorleston-on-Sea.

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at "Durandesthorpe," 19, Hazlewell Road, Putney, on November 20th, 1928, Mr. H. Donisthorpe in the Chair. Members present in addition to the Chairman, Mr. Robert Adkin, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, Dr. Harry Eltringham, Mr. W. J. Kaye. Visitors present.—Prof. Sir T. Hudson Beare, Dr. Malcolm Burr, Dr. K. Jordan, Dr. J. Waterston, Messrs. K. G. Blair, E. C. Leman, F. Laing and W. H. T. Tams. The members and visitors were received by Mr. and Mrs. Donisthorpe at 6.30 p.m. when tea and light refreshments were provided.

The Chairman's collection of Myrmecophiles was the special exhibit in addition to his collection of British Coleoptera. Supper was served at 8 o'clock. During the evening Mr Jas. E. Collin exhibited a specimen of *Eristalis lucorum*, Ing., a Syrphid dipteron new to Britain. This insect was taken by Mr. Collin on the Thames Marshes at Higham on July 22nd last, during the Entomological Club Meeting held at Speldhurst Close, Sevenoaks. The known distribution of this insect ranges from Lapland to Germany. The guests dispersed at a late hour after having spent a very pleasant evening.—H.W.-E. (delayed in transmission.)

Two Meetings of the Entomological Club were held at Oxford; on July 13th, Professor E. B. Poulton in the Chair, and July 14th Dr. Harry Eltringham in the Chair. Members present in addition to the Chairmen, were Mr. Robt. Adkin, Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis, Mr. J. E. Collin and Mr. W. J. Kaye. Visitors present—Prof. E. G. Waters, Dr. Hanitsch, Dr. Hugh Scott, Commander J. J. Walker, Messrs. A. W. H. Pomeroy, H. E. Andrewes, H. J. Turner, C. J. Wainwright and E. Bolton King. On Saturday, July 13th, the members and visitors met at the Hope Department at 3 o'clock and were received by Prof. and Mrs. Poulton and Dr. Eltringham. The afternoon was spent in examining the fine collections and the very interesting research work now being carried out by Dr. Eltringham, some results of which have been reported in the *Transactions* of the Entomological Society of London. Tea was provided at 4 o'clock. The guests then adjourned to their quarters in New College and assembled at Jesus College at 8 o'clock when dinner was served, Professor Poulton in the Chair. On Sunday morning the Entomological Collections at the Hope Department were again open to inspection and in beautiful weather various excursions were made in the town and vicinity. Lunch was provided at New College at one o'clock and in the afternoon an Entomological excursion was organised in motor cars to that renowned collecting ground Bagley Wood. The party again met at Jesus College in the evening where dinner was served at 8 o'clock, Dr. Harry Eltringham in the chair. The weather throughout the visit was very fine and warm, and during Monday morning the guests dispersed after a most successful and entertaining meeting.—H.W.-E.

In the *Ent. Zeit.* XLIII. 32, is a note on the *hassicus*, Pagst., subsp. of *Parnassius mnemosyne* with a plate of figures including one of the very black *umbratilis* of Fruhstorfer and several of the ab. *siegeli*, Pagst., in which there is a large black spot on the innermargin of the hindwing above that portion of the subcostal nervure which bounds the cell.

The *Prodromus der Schmetterlingsfauna Böhmens* should prove a useful work to lepidopterists. Pt. I. has already appeared and contains introductory matters including a reference list of literature of some 450 items.

In the *Can. Ent.* for February last is an article well worth reading giving an account on the feeding habits of *Polistes* wasps exhibited in the long series of experiments carried on by P. Rau. The wasps experimented with were marked in various ways by paint to make

them distinguishable from one another. Food was offered them in the forceps or placed in their way. The acceptance, rejection, malaxation and subsequent disposal of varied pabulum was noted. Each individual had its own individual likes and dislikes, tastes and methods of action, which again varied from day to day.

On page 46 of the same periodical there is a short Obituary of Dr. Dyar who died on January 21st. The author of the famous work on larval classification in 1895, his fame had been world wide. With J. B. Smith he revised the genus *Acrionicta* in 1895 and for nearly 30 years he was one of the band of illustrious workers of the United States most of whom have now passed away. Of late years he had devoted his attention to mosquito taxonomy. He was a most prolific worker and writer.

We have received a number of separates and pamphlets from Riga sent by Prof. Embrik Strand under whose supervision much of the zoological work of the University of Latvia at Riga is produced. (1) A few species of the genera *Lithobius* and *Geophilus* (Myriapoda) occurring in Lettland. (2) Critical notes on a few *Halictus* (Hym.) species. (3) A series of nomenclatorial notes on all orders of insects. (4) An Obituary of Dalla Torre the Hymenopterist and Botanist. (5) An article condemning the system of recognising "types" in zoology.

The *Entomological News* for July contains an interesting account of of the Carnegie Museum at Pittsburg, incidentally giving details of the life and work of the great Dr. Holland, Dr. Avinoff the eminent Russian naturalist, and others connected with it. There are two plates. There is a short note on Hesperiid Nomenclature which well illustrates the more considerable confusion caused by the local refusal to recognise the names in the *Tentamen* of Hübner.

In the *Am. de Pap.*, 236 (1929) there is an account of the *Erebia* species found in the central plateau of France. The species noted are forms of *E. melampus*, *E. epiphron*, *E. manto*, *E. oeme*, *E. stygne*, *E. aethiops*, *E. ligea*, *E. neoridas*, *E. tyndarus* and *E. euryale*.

Societas Ent., p. 32 (1929) has a record of the breeding of *Arctia caja* with 8 figures of the various forms obtained.

In *Ent. Zeit.*, p. 108 (1929) there are two detailed contributions discussing the status of the names *edusa* and *croceus* for our "clouded yellow" butterfly.

In the *Int. Ent. Zeit.*, p. 223 (1929), Herr Warnecke discusses the distribution of *Parnassius apollo* in Europe. The map illustrating the article is very instructive showing that the species is not always a high mountain one, for we find that the distribution is very disconnected, there being outlying colonies in S. Spain, S. Italy, Sicily, the Morea, the Rhine, the Crimea, S. Finland, Asia Minor, the Caucasus, and several in the Carpathians.

The *Int. Ent. Zt.* contains a valuable article on the Morphology and Biology of *Dysstroma* (*Cidaria*) *truncata* and *D. citrata*. It is a summary of all that is known so far of the two species with descriptions of all described forms and illustrated by 3 plates, one of anatomical details and two of imagines upper and undersides; a very useful series of figures of each species.

From two articles contributed by H. Belling to the *Int. Ent. Zeit.* XXII. 105 and XXIII. 437, we give the list of the named forms of *Hamearis (Nemeobius) lucina* recognised on the continent:—ab. ♀ *obsoleta*, Tutt, in which the black marginal spots are absent; ab. *fulva*, Ostheld., in which the ground colour has become yellow-brown with slightly blacker markings; ab. *semibrunnea*, Rbl., in which the upper-side of the hindwing is unicolorous blackish up to the marginal band; ab. *schwingenschuss*, Rbl., has the ground colour of the underside of the hindwing deep black brown; ab. *albomaculata*, Blach., has the middle of the upperside of the hindwing so marked as to appear white instead of brown; ab. *obscura*, Aign., especially dark specimens in which the hindwings show only traces of the usual rust-red colour; ab. *erica*, J. Steph., the hindwing with white streak-spots; ab. *albofasciata*, Kauchi, wings both above and below paler, the median fascia on the hindwings white on both surfaces; ab. *leucodis*, Lamb., the ground colour much restricted; the red-brown is replaced by a bleached yellow; ab. *nana*, J. Steph., small examples with an expanse of 11-12mm.; ab. *thurneri*, Dnhl., of special size and more brilliant colouring.

In *Bull. Soc. ent. Fr.*, Dr. Verity discusses the origin of the French races of *Heodes virgaureae*, showing the probable lines of distinction from a central Asian origin each forming groups of races and subspecies on their way (exerges) and other groups on the subsequent convergence and mingling of the races and subspecies so formed (synexerges).

In the *Irish Nat. Jr.* p. 178, Mrs. G. E. Lucas gives an account of the capture of a large number of the American "Army Worm" *Leucania unipuncta* in county Cork. 59 specimens in all were taken in 1928. The first at sallow in March, 3 more at ivy in October and November and the remainder at sugar in November and December. It would seem to suggest that the later captures were the result of successful breeding in the neighbourhood from eggs laid by a few immigrants early in the year. It will be interesting to see if any further captures be made in the present season.

Dr. Verity has had submitted to him the *Hesperiidi* in the collection of the Museum d'Histoire Naturelle de Barcelona, and in the Proceedings of the Nat. Science Soc. of Barcelona has contributed notes on the Catalanian representatives of the group comparing the geographical forms with those of Italy and the centre of France.

We have received from Dr. Verity a most useful separate for students of the Palaearctic Rhopalocera in a *Systematic Index* of all the subspecies, races and forms described by the late Herr. H. Fruhstorfer. These descriptions were scattered in so many different publications that to keep up with them or even to know of their existence was an almost impossible task for the student without ample opportunities for research. The names used by Fruhstorfer are retained although in many cases now not considered correct.

CORRECTION.—p. 105 ante "pines of six to nine feet in diameter" should read "six to nine inches."

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to Hy. J. Turner, "Latimer," West Drive, Chesson.

We must earnestly request our correspondents *not to send us communications identical with those they are sending to other magazines.*

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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. Hy. J. Turner, "Latimer," West Drive, Chesson.

Duplicates.—*S. Andrenaeformis*, Bred 1928, well set on black pins, with data.

Desiderata.—Very numerous British Macro Lepidoptera.—*J. W. Woolhouse, Hill House, Frances Street, Chesham, Bucks.*

Desiderata.—URGENTLY REQUIRED. Hants records of *Coixidae* (Hemiptera).—*H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.*

Duplicates.—*Strangalia aurulenta* (Col.), *Tenthredinidae* and *Aculentes*.

Desiderata.—Species of *Dolerus* and *Nematode sawflies* not in my collection; list sent.—*R. C. L. Perkins, 4, Thurstone Road, Newton Abbot.*

Duplicates.—Many species of Noctuid and selected forms.

Desiderata.—Early stages preferred. *Opina*, *populeti*, *gracilis* (Irish and Scotch and Manx), *gothicina* forms of *gothica* and selected unusual forms of *incerta*, *gracilis* and *munda*.—*A. J. Wightman, "Aurago," Bromfields, Pullborough, Sussex.*

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to exchange first class Chilean Coleoptera, especially *Carabus*, sps., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo- and Phytoecidia by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the rarer plant galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: *Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.*

WANTED FOR CASH OR EXCHANGE.—*Cryptocephalus* of the *Coleoptera-Chrysomelidae*. Will purchase or exchange. Send list of duplicates to: *Paul N. Musgrave, 514, Mt. Vernon Ave., Fairmont, West Virginia, U.S. America.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 16th. November 6th and 20th.

The South London Entomological and Natural History Society. *Hibernia Chambers, London Bridge.* Second and Fourth Thursdays in the month, at 7 p.m. October 24th. November 14th and 28th.—*Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C.2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcomed.—*Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.*

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All communications should be addressed to the Acting Editor, Hy. J. TURNER, "Latemar," West Drive, Cheam.

IMPORTANT

TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXVI.)

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GENUS *Acronycta* and its allies.—Variation of *Smerinthus tiliæ*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthenie*, and *aurelia*—The Doubleday collection—Parthenogenesis—Paper on *Taenioacampidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the inter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist or 1890—Lifehistories of *Agrotis pyrophila*, *Eponia lichenea*, *Heliophobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc., 360 pp.

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MELANISM AND MELANOCHROISM—Bibliography—Notes on Collecting—Articles on VARIATION (many)—How to breed *Agrotis lunigera*, *Sesia sphegiformis*, *Taenioacampa opima*—Collecting on the Norfolk Broads—Wing development—Hybridising *Amphidasys prodromaria* and *A. betularia*—Melanism and Temperature—Differentiation of *Dianthecias*—Disuse of wings—Fauna of Dulwich, Sidmouth, S. London—Generic nomenclature and the *Acronyctidae*—A fortnight at Runnoch—Heredit in Lepidoptera—Notes on Genus *ZYGÆNA* (*Anthrocera*)—Hybrids—Hymenoptera—Lifehistory of *Gonophora derasa*, etc., etc., 312 pp.

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EDITED BY

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**Pieris brassicae, L., with special reference to aberrations
from Aberdeenshire.**

By G. S. GRAHAM-SMITH, M.D., F.R.S., F.E.S., and W. GRAHAM-SMITH.

Apart from the racial differences and seasonal dimorphism, which is "well-marked in the whole of its range," variation in *P. brassicae* seems to be regarded as uncommon. For example, Adkin (1918) states that in 1917, when the species was very abundant, he "examined many hundreds, possibly thousands, of individuals as they sat on the flowers feeding," and except in one case, "failed to detect any marked variation in any of them." Verity (1916) thinks that "the migratory habits of *P. brassicae* have probably contributed in maintaining the lack of variation observed in the whole of Europe," and South (1921) suggests that "its abundance in any year in these islands is dependent on the arrival of a large number of immigrants . . . caterpillars resulting from alien butterflies may absolutely swarm in the autumn of one year, but the eccentricities of an English winter may be too much for the vitality of such of them as escape their enemies."

In September, 1926, we collected 107 pupae from trees and posts around a field of cabbages at Arnage, Aberdeenshire. These were kept during the winter in an unheated shed at Cambridge, and 101 adults emerged, all showing the characters of the form *chariclea*. Among the males one was an example of *ab. nigronotata*, and among the females were two examples, one of which was the last specimen to emerge, with the discal spots connected by a suffusion of black scales in both upper and undersides, and with the upper spot connected with the apical blotch by dark scaling along nervures 3 and 4, four examples with slight indications of dark scaling between the discal spots on the undersides only, four examples of *ab. postero-maculata*, and two with the undersides of the lower wings pale yellow and lacking in dark scales.

This high percentage of aberrations induced us in the following September (1927) to collect a considerable number of caterpillars from cabbages in the garden at Arnage. These were transferred to Cambridge and the pupae were kept in the shed mentioned. Nearly all the pupae survived the winter and produced, with two exceptions, normal-sized imagines. It is therefore evident that the pupae at least if protected from damp, survive the winter.

Mr. Esson informs us that in Aberdeenshire there seems to be only one brood of larvae annually. This may be derived from immigrants from the South, from locally bred adults, which have survived the winter as pupae, or from both sources. This subject which is of considerable interest, requires careful investigation, but we are inclined to think that in normal years the species is single-brooded and derived from locally-bred adults.

The following facts seem to support this view:—

(1) Immigrants of the first southern generation, arriving in May or June, would presumably produce larvae from which a second generation of adults, with the characters of that generation (*brassicae*), would emerge in August. The latter should produce a second brood of larvae in late August or September. Unless the first brood of larvae is always numerically so small as to escape observation this sequence does not occur.

(2) Immigrants of the second southern generation, arriving in July and August, would produce the brood of larvae which occurs in September, but in this case all adults caught in Aberdeenshire should exhibit the characters of the second generation. The contrary, however, seems to be the case for all the 34 Scotch specimens in the British Museum exhibit the characters of the first generation, *chariclea*.

(3) If locally-bred adults are responsible for the September brood of larvae emergence must be very late, and all Aberdeenshire specimens should exhibit the characters of *chariclea*. From our pupae, transported to the warmer climate of Cambridge, adults emerged later than usual, and we assume they would have emerged still later in the colder climate of Aberdeenshire.

In regard to the effect of winter cold on the pupae it is of interest to record that adults commenced to emerge in the third week of May, 1929, from pupae, which had passed the winter in Cambridge (1) indoors, (2) in an out-of-door cage, and (3) on fences. The winter was the coldest for many years, but the rainfall was deficient. Wild *P. brassicae* were abundant in the spring.

(4) Eggs were laid in June, 1928, by adults which emerged in Cambridge from pupae brought from Aberdeen in September, 1927. The resulting larvae, which fed up on cabbage under practically natural conditions, namely in a very large net-cage out-of-doors, produced pupae in July, but no imagines emerged during the autumn. This fact suggests that the character of single-broodedness is inherited, at least for one season, by the Aberdeenshire race, even when transported as far south as Cambridge. Emergence commenced both in the cage and indoors in the third week of May, 1929, nearly 25 per cent of the males exhibiting the aberration *nigronotata*.

(5) In two successive seasons, 1927, 1928, adults from Aberdeenshire larvae showed a high proportion of aberrations, 2 and 3 per cent in the males, and 20 and 10 per cent in the females, suggesting the presence of a local race.

It has been urged that the high proportion of aberrations was due to abnormal conditions imposed on the larvae by confinement or on the pupae by their sojourn under shelter during the winter. In the 1927 series the first of these possible causes did not exist for the pupae were collected from trees and posts. The second suggested cause may have had some influence, but not through excessive heat, since the temperature of the shed varied but little during the winter from that prevailing outside.

(6) In September, 1928 and 1929, larvae were diligently searched for in the Arnage garden, which is very isolated and surrounded by high trees, but very few were found. We think the scarcity may have been due to the very high proportion removed in the previous years.

(7) In both 1926 and 1927 the proportion of larvae parasitised was low. It is of interest to note that in the former year the parasite produced was almost exclusively a hyperparasitic Ichneumon, *Hemiteles* sp., which in this locality doubtless keeps in check the chief enemy of *P. brassicae*, the Braconid, *Apanteles glomeratus*, and thus prevents excessive parasitism of the local race. Some examples of the rare *A. nubicula*, determined by C. Morley, were also bred.

With few exceptions the 906 adults, which emerged in 1928, exhibited the characters of the form *chariclea*. They were examined and recorded daily, and all aberrations were preserved.

		MALES.	FEMALES.
May	26	—	—+1 <i>fasciata</i> .
	27	3	—
	28	4	6
	29	18	7+1* <i>fasciata</i> .
	30	18	9+1 <i>fasciata</i> +1 <i>biligata</i> .
	31	11	7
June	1	10+ { 1 <i>nigronotata</i> 1 <i>fasciata</i>	11+2 <i>fasciata</i> (1*).
	2	20+1 <i>semi-nigrescens</i> (upper) and <i>anthrax</i> (under)	20
	3	33	25+1* <i>fasciata</i> +1 <i>vasquezi</i> .
	4	22+1 <i>semi-nigrescens</i> (upper) and <i>venata</i> (under)	18+3 <i>fasciata</i> (2*).
	5	14	10+2* <i>fasciata</i> .
	6	36	45+5 <i>fasciata</i> (2*).
	7	40	22+4 <i>fasciata</i> (3*)+1 <i>postero-</i> <i>maculata</i> .
	8	31+2 <i>nigronotata</i>	23+6 <i>fasciata</i> (3*).
	9	25	19+6 <i>fasciata</i> (5*)+1 <i>biligata</i> .
	10	21+2 <i>fasciata</i>	22+3 <i>fasciata</i> (2*).
	11	16	7+1* <i>fasciata</i> .
	12	18+ { 2 <i>nigronotata</i> 1 <i>fasciata</i>	19+1* <i>fasciata</i> .
	13	14	17+4 <i>fasciata</i> (2*).
	14	13+ { 2 <i>nigronotata</i> 1 <i>bi-nigronotata</i>	18
	15	3	4
	16	4	2
	17	9	11+1 <i>pallida</i> .
	18	3	6
	19	7	10+1* <i>fasciata</i> .
	20	8	14
	21	8 (1 small)	6+1* <i>fasciata</i> .
	22	3	5
	23	8	7
	24	3	6
	25	3	7
	26	2	5
	27	—	1
	28	2	1
	29	—	1
	30	1	3
July	1	1	2
	2	—	—
	3	1	—
	4	—	—
	5	—+1 <i>nigronotata</i>	2 (1 small)
	6	2	1
	7	2	1
	8	—	1
	9	1	—
	10	—	—
	11	—	1
	12	1	—
	13	1	—
	14	—	—
	15	—	2
		440+15	401+48

The above table shows that although all passed the winter under the same conditions the period of emergence was spread over 51 days from May 26th to July 15th. Fresh specimens captured during the latter month may therefore belong to the first brood.

The table also shows that males and females emerged in approximately equal numbers over the whole period and that aberrations were not restricted to early or late emergences. Further this appears to be the only bred series recorded on a sufficiently large scale to give an opportunity of estimating the frequency of aberrations.

Though we are well aware of the objections which have been urged against the naming of aberrations, we have ventured to give names to some of the marked aberrations we have either bred or seen in collections. An excellent description is frequently neglected when no name or only a symbol is attached. Stephens (1828), for example, described four forms of *P. brassicae*, to one of which he gave the well-known name *chariclea*. The others, which he designated as *var. a.*, *β.*, etc., were seldom referred to until they were named by others, nearly a hundred years later. Moreover it is almost impossible without the aid of names to give any indication of the frequency of aberrations in different localities or in forms, races or allied species.

Among the 455 males there were 8 examples of *ab. nigronotata*, Jachontov (1.7 per cent.), of which 7 had linear (one unilateral) and 1 large, diamond-shaped spots. One of them showed the aberration *fasciata* on the underside. There was one example of *ab. bi-nigronotata*, and 5, including the one mentioned above of *ab. fasciata* (1.1 per cent.) on the underside, of which 2 were well-marked, 2 less marked and 1 unilateral. There were also 2 examples of *ab. semi-nigrescens* on the upper surface, combined with *ab. venata*, Verity, on the underside in one and *ab. anthrac* on the underside in the other. One small specimen measured 52mm. Altogether 15 (3 per cent.) of the males exhibited some well-marked forms of variation.

Among the 452 females there were 43 (9.5 per cent.) examples of *ab. fasciata*, of which 28 (6.2 per cent. indicated by * in the table) were well-marked—In 22 of the well-marked examples both upper and under sides were affected, though not to an equal extent in all cases, while the remaining 6 exhibited only slight indications on either the upper or under side. In the less marked examples the aberration was confined to the upperside in 4 and to the underside in 11.

The aberration *postero-maculata*, Verity, was found in 12 (2.6 per cent.) specimens, in 10 together with *fasciata*, in 1 together with *biligata*, and in 1 without other aberration. In 6 of these specimens the dark spots were conspicuous.

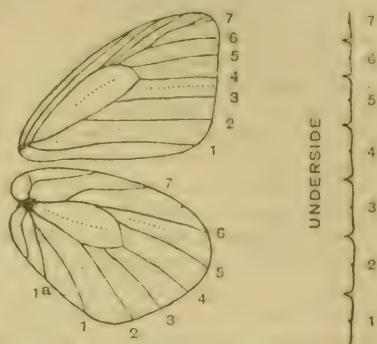
The aberration *biligata* was present in 6 (1.3 per cent.) specimens, in 4 together with *fasciata*, in 1 together with *postero-maculata*, and in 1 without other aberration.

One example near *ab. rasqueti*, Oberthür, was obtained, and one of *ab. pallida*, somewhat resembling the female figured by Frobawk (1914, pl. III., fig. 20). There was also one small example measuring 56mm.

Altogether 48 (10.8 per cent) of the females exhibited some well-marked aberration.

Before proceeding to describe the aberrations mention may be made of folds between the nervures, which do not seem to be mentioned

in any of the works to which we have had access, but which are prominent structures in freshly emerged specimens, and which influence the markings to some extent. The position of these folds, for which the name 'interneural folds' is suggested, are indicated in the diagram. Each fold consists of a V-shaped depression on the upper surface of the wing, with a corresponding projection on the under surface. The folds tend to divide certain of the dark spots through which they pass, particularly the lower discal spots, especially on the underside in both sexes, and the costal spots of the underwing. In *P. rapae* complete division of the lower discal spot is common. In almost every example of *ab. fasciata* the black dusting of scales between the two costal spots is divided more or less completely by a fold.



LEGEND FOR TEXT FIGURE.

- (Left). Venation of *P. brassicae*. Veins numbered according to South (1921, p. 12). The "interneural folds" are indicated by dotted lines.
- (Right). View of outer margin of forewing (enlarged) to show the V-shaped depressions on the upperside and the corresponding projections on the underside caused by the "interneural folds." The veins, which project slightly on the underside, are numbered.

(To be continued.)

The New Forest.

We have received the following series of Resolutions, which were discussed at a full meeting of the Entomological Society of Hampshire on September 28th and carried unanimously. We understand that the Forestry Commissioners are being urged by local pressure to take certain measures to alter the nature of the Forest. The bogs, such as Matley, are an integral portion of the Forest and if drained much of the characteristic fauna and flora would be irretrievably destroyed, because one or two cattle get "bogged." There is a local desire to cut the indigenous trees, and plant conifers, which would give a quicker return. Again a destruction of the present fauna and flora. The Commissioners are not averse to carry on as before, but want strongly supporting against the very strong local pressure, which is being brought to bear on them by commoners, whose only care for the Forest is to make it produce £ s. d. All lovers of nature should protest individually and collectively against any desecration such as are condemned in the Resolutions.

The following Resolutions were passed at a Meeting of the Entomological Society of Hampshire, held in Southampton on September 28th, 1929. They were proposed by Mr. W. Parkinson Curtis, F.E.S., of Bournemouth, seconded by Mr. Alan Druitt, F.E.S., of Christchurch and carried unanimously at a fully attended meeting.

Resolved that inasmuch as the rapid development of rural districts is seriously restricting the area available in England for the preservation of the natural Flora and Fauna of the Country, which are in consequence in danger of extinction, the New Forest ought so far as possible to be treated as a Nature Reserve; and that inasmuch as the main object of a Nature Reserve is the preservation of all objects of wild nature and especially of the indigenous Flora and Fauna, this Meeting views with concern the continued deterioration of the New Forest as a natural woodland, and recommends that:—

(1) So far as is compatible with the strictly legal rights of the Commoners the whole Forest be maintained as a Nature Reserve.

(2) New rights should on no account be granted, and the extension of, or excessive exercise of, existing rights should be rigorously guarded against.

(3) As burning and drainage are incompatible with a Nature Reserve, no further burning and drainage should be undertaken.

(4) The closed blocks be effectively closed, so as to prevent the trespass of animals, except in so far as, preliminary to regeneration, the trampling of animals may be considered by the Forestry Commissioners desirable.

(5) As the natural spread of any indigenous tree is not incompatible with rights of common, such spread should not be prevented.

(6) No new macadamised roads should be constructed.

(7) The management of the enclosed blocks be continued on the lines recently adopted by the Forestry Commissioners and the Advisory Committee, especial regard being paid to the reproduction of broad-leaved species where these are likely to thrive in preference to conifers.

(8) The attention of the Commissioners be called to the rapid and progressive decay of the unenclosed old woods, and the regeneration of the yet open Forest should be undertaken where legally possible by mere enclosure rather than by planting, and that the whole area that it is legally possible at any time to enclose should be enclosed.

(9) The Forestry Commissioners are the best agency at present available for the control and management of the New Forest on behalf of the public.

Notes on a Dipteron and two Chalcids galling False-Brome grasses (*Brachypodium* spp.).

By RICHARD S. BAGNALL, D.Sc., F.R.S.E.

Since Harrison and I published our paper on the genus *Harmolita* in these pages (1928, pp. 68-69) I have had the opportunity of examining both our species of False Brome (*Brachypodium silvaticum* and *B. pinnatum*) in the South of England, making the following additions to our known Zoocecidia:—

Brachypodium silvaticum, Roem. et Schult.

Whilst collecting in the neighbourhood of Seale, Kent, on a showery day last Autumn I had the occasion to take shelter under a large tree by the roadside under which several clumps of this grass were growing. Idly examining the stems for the characteristic saddle-shaped galls of the gall-midge *Poomyia hellwigi*, I found several brittle

discolored areas, for the most part just above or below a lower node, which were slightly swollen when immediately adjoining a node, but otherwise scarcely perceptibly swollen. Being late in the season the stems were inclined to break across these galls, in several of which reposed a solitary Chalcid pupa of an unknown species of *Harmolita*. Searching near the roots, I also discovered some old Shoot-galls (with their curiously shortened and broadened scale-like leaves) of the Dipteron *Chlorops cingulata*, Meigen.

Brachypodium pinnatum, Palisot.

It was only in the early October of this year that I found a long-deferred opportunity of examining *Brachypodium pinnatum* for the gall of *Harmolita brachypodii*, Schl. This grows in profusion North of Harewood Forest, near Andover, Hants, and the gall, which occurs there takes the form of a fusiform swelling with a shortening of the internodes and consequent bunching of the leaves. *H. brachypodii* is also an addition to the British fauna and is recorded in Houlard from Germany, France and Italy. It was too late to definitely determine the presence of Eriophyiid deformation, and I hope to make a closer study of the grass at a more appropriate season next year.

A pale *Anatis ocellata*.

By T. F. MARRINER, F.E.S.

Some years ago I had occasion to send a number of my *Coccinellidae* up to Mr. G. B. Leman in London and he showed them to Mr. H. Donisthorpe. Among them was a very pale coloured variety of *Anatis ocellata*, which, at the outset caught Mr. Donisthorpe's attention, and resulted in some little correspondence. Mr. Donisthorpe at first thought its pale colour was due to immaturity, but I was able to satisfy him that this was not the case. A few years later, when camping in a war-time clearing in the midst of pine woods for the purpose of studying the life histories of certain *Coccinellidae*, I came across the same pale variety, as also did my camp assistant. We spent a month on the spot and learned a great deal about *A. ocellata*, *M. oblongoguttata*, *A. oblitterata*, *C. hieroglyphica*, *C. 10-punctata (variabilis)*. Quite early in the month we were fortunate enough to come across two males of the pale variety and one female. The female was paired with one of the males, but unfortunately the time to return to town came before the life-cycle was completed and only two imagines came through. Both of these, like the parents, were of the pale variety. These were kept alive for over a week in order to note any colour deepening, but none took place. The odd male was kept alive for some days after capture but no colour change took place. Work with other species claimed most of my time, and it was four years later that I next came across this pale *ocellata*. I then took a specimen from its winter quarters among pine needles at the foot of a pine, on the south side of the tree. This was in a wood about eight miles from my old camping haunt. The other day I was looking over some *Coccinellidae* in the collection of Mr. James Murray, a life long student of the Coleoptera of Cumberland and the Solway area, when I came across a fine specimen of the same variety he had taken in Dumfriesshire. It was

the only specimen he had ever come across. Upon questioning Mr. F. H. Day of Carlisle, who is the recognised authority upon the Cumberland coleoptera, I found he had taken four specimens in something like 40 years of collecting, and these were all from an area about four miles from my camping ground. The particular specimen which Mr. Donisthorpe saw, I had taken at Kingmoor, near Carlisle, in June, 1915.

Tabulated, these results are :

April	17th, 1898.	2 specimens at Orton Wood.	F. H. Day.
June	5th, 1898.	1 specimen at Orton Wood.	F. H. Day.
June	10th, 1915.	1 specimen at Kingmoor, Carlisle.	Self.
Sept.	10th, 1917.	1 specimen at Orton Wood.	F. H. Day.
Aug.	12th, 1921.	3 specimens at Sowerby Wood.	Self. Two bred specimens from two of last named.
March	9th, 1924.	1 specimen from pine needles at Rockcliffe.	Self.
Sept.	5th, 1928.	1 specimen at Mulberry Moss, Dumfriesshire.	J. Murray.

This is a total of 12 specimens got at various points within 10 miles of Carlisle, and I have not been able to find any records of the variety being taken anywhere else. I shall be pleased to hear from any other coleopterist who has come across it. Meanwhile it occurs to me that so distinct a variety should have a name. So far as I am able to discover, the variety has been neither definitely recorded nor named, and in that case I would like to propose "*Anatis ocellata* v. *pallida*."

Description of the Larva of *Automeris liberia*, Ob.

By K. J. HAYWARD, F.E.S., F.R.G.S.

Length generally about 110mm.

Dorsally pale bluish green, laterally more yellow green, as also beneath.

A pair of dorsal and lateral branched yellow-green spines on each segment except the sixth abdominal where these spines are replaced as is usual by only three. These spines are about one centimetre long. There is a marginal row of spines about 2mm. in length but otherwise similar, and a still lower row of slightly smaller spines. These are repeated on all segments except the abdominal leg bearing segments. An oval, dark greenish-grey, lateral spot (major axis vertical) on the abdominal segments, immediately above a marginal white stripe that is edged upwardly at the folds with black. Beneath this line at the folds is a black patch on the abdominal segments closely covered with small roundish white spots with minute black centres. Claspers and anal segment brown with white speckling and short hairs, the actual claspers ochreous with a dull black sheath. The spiracles are orange-brown.

The pupa is short and thick of a very dark brown, enclosed in an untidy thick web-like cocoon, spun up in some dry corner.

The larva is common in and around Buenos Aires, feeding, I am told, on *Ipsoido acer*, but I imagine it feeds on various trees, as I have found it crawling down plane trees (*Platanus*) looking for a pupating site, as also on other varied trees, but I have not observed it feeding.

The larva stings rather badly if roughly handled, or if the spines are touched at all heavily. The "sting" raises a small white lump, with inflammation spreading up to about an inch in diameter, the extent depending on whether the part of the hand or body affected is tender or hardened. The pain exactly resembles that of a burn, lasting in my case for about ten minutes, having taken some three minutes to develop. At the end of this time the pain rapidly dies away but the spot remains sore for about a further hour, after which time no ill effects are felt.

The autumn pupae stay over till about the end of September, in the other broods the pupal state lasts from 18 days to three weeks.

New Forms of Lepidoptera.

In *Lamb.* p. 98, M. Cabeau describes and names a partially xanthic form of *Dryas paphia* as ab. *fontanei*, in which the whole upper surface of the hindwings and the apical area of the forewings are of a whitish colour instead of the typical deep ochreous orange. At the same time he calls attention to a previously described and named albinistic form ab. *caroffiana*, which has four oval white spaces, one on each of the four wings. It has always seemed to us that chance aberrations of similar character and arising apparently from similar pathological causes should all go under one classificatory designation, rather than be individually named, and particularly with terms which give no indication whatever of the nature of the aberration recorded.

In *Int. Ent. Zt.* of October 6th H. Mannes describes a remarkable form of *Spilartia lubricipeda* in which the forewings from the outer margin almost to the disc are suffused with deep black, with only a few single spots of the yellow ground showing, while the hindwings are irregularly marked with black spots. It is a female bred at Augsburg in 1925. He has named it ab. *nigrita*.

Notes.

Dr. Verity has sent a copy of his article published in the *Annales Soc. ent. Fr.* on the distribution of "*Plebeius idas*," L. (*argus*, Schiff. = *argyrognomon*, Bergstr.) and perhaps it might be useful to our readers to abstract from it the names of the various forms, with the bibliographical reference for each and the locality of each.

On the status of the name *idas* there are diverse opinions; but all will agree that it is quite time that the confusion caused by the allocation of the name *argus* to two separate species should be dissipated. For many references on this question see Courvoisier, *Iris*. XXVIII. 198-199 (1914), etc.

Plebeius idas, L., *Fn. Suec.* Hæd. 283 (1761): *argus*, Schiff., *Wien. Verz.* 184 (1775): *argyrognomon*, Bergstr., *Nomencl.* II. 76, pl. 46, III. 6, pl. 51 (1779).

Gp. *bellieri*.

r. *bellieri*, Obth., *Ét. Lép. Comp.*, IV. 190, fig. 280 1 (1910). Mts. of Corsica.

f. *bellieroides*, Vrtý., l.c. Clavières.

Gp. *idas*.

r. *opulenta*, Vrtý., *Ann. Soc. ent. Fr.* XCVI. 7 (1927). Intra, L. Maggiore, Turin, Carniolica.

f. *latolimbo*, Vrtý., l.c.

- r. nirea*, Courv., *Ent. Zt.* 88 (1910). Pfynwald.
r. dubia, Schulz., *Stett. e. Zt.* 135 (1881). Gary sur Oder, Pomerania.
r. idas, L., *Fn. Suec.* IIed. 284 (1761). South Scandinavia.
 gen. II., *arida*, Vrtý., *l.c.* Atzwang, Tyrol.
r. lapponica, Gerh., *Mon. Eur. Schm.* 19, pl. 34 (1853). Suldén, Ortler.
r. argulus, Frey., *Mitt. Schweiz. ent. Gess.* 350 (1882).
r. ralesiaca, Obthr., *Lép. Comp.* I. 19, pl. II. (1904). Martigny, Valais.
r. magnalpina, Vrtý., *l.c.* Cesana, Alpes Cottiennes.
r. alpophila, Vrtý., *Ent. Rec.* XXXI. 46 (1919). Tuscan Mts.
r. alpina, Berce., *Fn. Ent. Fr. Lép.* I. 134 (1867). Basses Alpes, Larche, Oulx, Valdieri.
 f. *saturior*, Vrtý., *l.c.* Pyrénées Orientales, Vernet.
r. apenninophila, Vrtý., *Ent. Rec.* XXXI. 46 (1919). Fegana, Tuscany.
r. argellus, Turati, *Soc. Ent.* XXVI. 67 (1911). Salso-Maggiore, Parma.
r. croatica, Grund., *Int. Ent. Zt.* VII. 127 (1913). Croatia, Dalmatia.

Gp. *calliopsis*,

- r. australissima*, Vrtý., *Ent. Record* XXXI. 46 (1919). Tuscan coast, F. dei Marmi.
 f. *ultima*, Vrtý., *l.c.* Florence.
 f. *misera*, Vrtý., *l.c.* Monts. Mainarde, Caserta.
r. abetonica, Vrtý., *Bull. Soc. Ent. It.* XLII. 273 (1910-11). Col de l'Abetone, Tuscany.
r. calliopides, Vrtý., *Ent. Record* XXXI. 46 (1919). Alpes Occidentales, Digne.
r. calliopsis, Bdv., *Icones.* 58, pl. 15 (1831-41). Polygone de Grenoble, Dauphiné.

Dr. Reverdin and Dr. Chapman established that there were two species confused under the *idas-argus-argyrognomen* species.

The unrecognised species was *Plebeius insularis*, Leech.

Plebeius insularis, Leech.

- r. insularis*, Leech., *Butts. China.* 302, pl. XXXI. (1893). Yesso, Japan.
r. praeterinsularis, Vrtý., *Ent. Record* XXXIII. 175 (1921). Yokohama, Japan.
r. calabricola, Vrtý., *l.c.* St. Fili, Calabria.
r. ligurica, Obthr., *Lép. Comp.* IV. 201, pl. XLI. (1910). Cassarate, Lugano, Cernobbio.
r. latialis, Rostagno = *mira*, Vrtý., *Bull. Soc. zool. It.* XI. 50 (1911). Cavo, Rome, Florence.
r. aegus, Chap., Obthr., *l.c.* XIV. 42 (1910). Val d'Isère, à Thiancourt et Paris.
r. euergetes, Stauder, *Iris*, XXVIII. 15 (1911). Illyria (Carniola, Corinthia, Trieste).
r. aegusella, Vrtý., *Ent. Record*, XXXIII. 175 (1921). Moravia, Bohemia.
 ?*r. difficilis*, Stauder, *Ent. Anz.* II. (1922). Arlberg, Tyrol.

[MISUSE OF THE SPECIFIC NAME *IDAS*.—Is it ignorance or sheer perversity which causes the name *idas*, L., still to be used on the Continent for *Plebeius argus*? It was shown quite conclusively by Bethune-Baker so long ago as 1913 (*Ent. Rec.* XXV, p. 252) to be quite inadmissible for either this or any other species. The argument, which is very fully elaborated in the article above referred to, may be condensed as follows:

Linneus's first use of the name was applied to an Indian species (probably the Indian form of the ♀ of *P. icarus*) (*Sys. Nat.* xth Ed., p. 483); his second use of it for the ♀ of *P. argus* (*Fam. Suec.*, 2nd Ed., p. 253) is therefore inadmissible, as the name was already pre-occupied. This one fact surely settles the matter.

I have intentionally used the name *argus* above, as I still hold that I showed conclusively (*Ent. Rec.* XXVI, p. 34), that *P. argus* and *P. aegon*, are the correct designations of the two species long known by those names.—GEORGE WHEELER.]

[REFERENCES TO *IDAS-ARGUS-ARGYROGNOMON*.—Courvoisier *Ent. Zt.* XXIV, 71, etc. (1910); Courvoisier *Int. Ent. Zt.* VI, 213, etc. (1912); Linstow *Iris* XXVII, (1913); Courvoisier *Int. Ent. Zt.* VII, 111, etc. (1913); Courvoisier *Int. Ent. Zt.* VII, 112, etc. (1913); Verity "Revision" *Jr. Linn. Soc.* 188-9 (1913); Bethune-Baker *Ent. Rec.* XXV, p. 252 (1913); G. Wheeler *Ent. Rec.* XXVI, 34 (1914); Courvoisier *Int. Ent. Zt.* VIII, 91 (1914); Courvoisier *Iris* XXVIII, 198, etc. (1914).—HY. J. T.]

NOTES ON COLLECTING. etc.

IRREGULAR PAIRING.—A curious pairing has been recorded by E. W. Wade in the *Naturalist* for October. Last July in Somerset a ♂ *Epinephela jurtina* was captured paired with a ♀ *Argynnis aglaja*.

In the *Am. de l'ap.* for September two other irregular pairings are reported by M. G. Praviel. *Euchloë cardamines* ♂ with *Bapta temerata* ♀, and in the Forêt de Chantilly *Hybernia marginaria* ♂ with *Scianta bilunaria* ♀. [The same irregularity has been previously recorded *v. Ent.* XXI, 188.—G.W.]

WYRE FOREST DIPTERA.—Mr. C. J. Wainwright in his interesting notes on "Wyre Forest Diptera" (page 37-69) indicates that he is not publishing full lists of all taken or observed, so perhaps I may be excused for supplementing his list with three species met with beyond the Button Oak on May 29th, 1926. They were *Criorrhina floccosa*, Mg., *Myopa buccata*, L., and *M. testacea*, L. The *C. floccosa* was the first specimen of the species I had ever met with: curiously enough I met with another the following day at Badby, Northants, and again the day after at a wood near Halesowen, Worcestershire, and this year I met with it at Hill Wooton, Warwickshire.

Mr. Wainwright also speaks of his *Bombus arceolar*, Nik., as the only one he has met with in the Midlands so it may be of interest to know I had a specimen from Bubbenhall, Warwickshire, 14.V.1922, and another from Ufton Wood near Leamington, 29.V.23. —J. W. SAUNT, (A.L.S.), "Epperstone," Bull's Head Lane, Stoke, Coventry.

LATE APPEARANCE OF *CRIORRHINA OXYACANTHAE*, Mg.—I was greatly surprised when collecting at Farnborough Hall, South Warwickshire on August 11th, to meet with this species, which one usually associates with hawthorn blossom in May, quite six weeks later in the season than any I have taken before. At the same place about 6 p.m. I caught the small earwig *Labia minor*, L., on the wing, its feeble flight resembled that of a species of *Gracilaria* moth.—Id.

DISTRIBUTION OF *CYNOMYIA MORTUORUM*, L.—E. K. Pearce, "Typical Flies," 3rd series speaks of the above species as—"being a coast fly though not entirely so." I have met with it at Ryton, and Bubbenthall, Warwickshire, 3.VI.1928, in Derbyshire at Danesmoor near Clay Cross, 14.V.1921, and in Hants at Warboys, 16.V.1927; at the latter spot it was my great good fortune to take a perfect specimen of *Pocota apiformis*, Schrk.—Id.

CURRENT NOTES AND SHORT NOTICES.

A Meeting of the Entomological Club was held at Speldhurst Close, Sevenoaks, on September 14th, 1929, Mr. H. Willoughby-Ellis in the Chair. Members present—Mr. Robert Adkin, Mr. Jas. E. Collin, Mr. W. J. Kaye, and the Chairman.

Visitors present—Capt. E. Bagwell-Purefoy, Mr. E. C. Bedwell, Dr. E. A. Cockayne, Capt. A. E. Hemming, Dr. Karl Jordan, Mr. F. Laing, Mr. G. C. Leman, Mr. Frank Muir, Mr. W. Rait Smith, Capt. N. D. Riley, Mr. W. H. T. Tams, Mr. B. S. Williams. The members and visitors arrived at Speldhurst Close at 2.30 p.m. and were received by Mr. and Mrs. Willoughby-Ellis. In beautiful weather the afternoon was spent in the gardens and woods attached to Speldhurst Close where tea and light refreshments were provided. The whole of the natural history collections were open for inspection throughout the day. The portion specially arranged for show included the complete series of British *Sesiidae* and *Sphingidae* and many interesting varieties of British Butterflies. A collection of Coleoptera showing the distribution of British beetles in the Midland Counties collected by the Chairman within a radius of 40 miles from Birmingham, and in addition the completed portions of the collections of Coleoptera he has presented to Harrow School and to the Torquay Natural History Society were shown. Supper was served at 7.30 p.m., the guests leaving about 11 o'clock. Those who were able to remain spent the week-end at Speldhurst Close with a view to making an Entomological Excursion on Sunday. The weather however was too dry and hot for successful collecting and the day was spent in the wood adjoining the house and the party dispersed on Monday morning after a successful meeting.

To the current Vol. II., of the *Bull. Ins. Roy. d'Hist. Nat.* of Sophia, Bulgaria, Dr. Buresch has contributed two articles (1) An account of the activities of King Boris of Bulgaria in the study of nature, with numerous illustrations. The expeditions he has undertaken particularly to investigate the flora and fauna of the country, the institutions he has fostered and the eminent naturalists of local fame who have helped, are referred to more or less in detail. (2) An

article on the "Horizontal Distribution of the Lepidoptera in Bulgaria." In the same part is a very well illustrated description of the Royal Zoological Gardens at Sophia by Prof. Schumann (23 figs. and a map). Navas deals with the Neuroptera of Bulgaria and Drensky with the Bloodsucking *Tabanidae* (Dip.) among contributions in other orders. Much of the matter is in French and German.

In recent numbers of the *Ent. Rund.*, Herr Ruediger has been discussing the collecting and study of the Micro-lepidoptera, summarising what has been done in the past by authors and workers in various countries, the position of the different families and the Herculean task which lies before those, who will in the future take in hand the study of the micros of exotic lands.

In the *Ent. Zeit.* no. 12, Herr Dannehl concludes his very interesting and full account of the Lepidoptera of South Tyrol. He records 1308 species (not including the micros) with 2022 varieties and forms, of which 173 species and 417 varieties are Rhopalocera. Of these 216 are newly recognised and named. For a long time to come this contribution to local lepidopterology will be a most valuable help.

The same number contains an important article on the occurrence of the *ralesina* characteristics in the ♂s of *Dryas paphia*, which had hitherto always been recorded as occurring in the ♀ only. The contribution is by Dr. E. Fischer and is illustrated by a plate of 6 figures.

The *Int. Ent. Zeit.* no 12, contains a long article on the collecting of larvae of the *Geometridae* with many references to habits, etc., and a contribution to the Odonata (Paraneuroptera) - Fauna of Germany.

The great Catalogue of Lepidoptera *Lepidopterorum Catalogus* published by Dr. Wm. Junk of Berlin has just reached its Pars. 36. Part 34, *Psychidae* by Dalla Torre and Strand consists of 202 pages and appears to be a most thorough summary of the world's references on the family. Part 35, deals with a section of the *Papilionidae* (*Lamproptera*, *Cressida*, *Euryades* and *Troides*) by Felix Bryk, and Part 36, with the *Heliconiinae* by H. Neustetter. It is a pity that the format should be changed in this part from that which everyone is accustomed to in the preceding parts. The erroneous expression of the species is adopted; *egeria egeria*, Cramer. This should be *egeria*, Cramer, *egeria*, with the name of the author who first differentiated the particular *egeria*, Cramer, from the totality of forms which the original *egeria*, Cram., included at its birth. The value of these catalogues is inestimable to students of the Order.

Part 2 of Vol. V. of *Eos*, the Spanish entomological journal, has recently appeared. It contains two papers on Hymenoptera (1) *Chalcididae*, (2) *Sphagidae*, one on Ants, one on Lepidoptera and one on Orthoptera. There are four plates and numerous figures in the text.

Mr. L. E. Hope, F.L.S., the retiring Curator of Tudor House Museum, Carlisle, was the guest of honour at a public gathering in the County Hotel, Carlisle, on October 23rd.

The gathering was representative of the Scientific, Literary, Historical, Artistic, and Natural History Societies, and friends of Mr. Hope and his work at the Museum, and, on behalf of these, Sir Henry Miers, President of the Museums' Association handed Mr. Hope a cheque as a token of esteem. Sir Henry gave a short address upon the work of Museums and the place such an institution should occupy

in the life of the City or Area in which it is situated. Mr. Hope, in replying, spoke of the many willing helpers he had had in his endeavour to bring the Museum up to its present high standard, and said that his meetings with such men as Sir Henry at Museum Association Conferences had been a great source of help and inspiration. Other speakers deprecated the folly of permitting a red tape regulation to deprive the City of the services of a man like Mr. Hope when, except in years, he was full of vigour and good health. All wished Mr. Hope long life and happiness in his retirement.

On the evening of the following day, October 24th, Mr. Hope was the guest of honour at a meeting of the Carlisle Natural History Society of which Society he has been a great mainstay for over 30 years. The Society presented him with a gold watch suitably engraved. The presentation was made by Mr. Ben Johnson a well known local ornithologist and one of Mr. Hope's oldest Carlisle friends.

A writer in the *Int. Ent. Zeit.* for October 1st discusses the present price of the parts of Seitz' *Grossschmetterlinge der Erde*. While one must say that one shilling (mark) per part for all the early numbers was extremely low, it must be admitted that the present price four shillings and sixpence (M4.50) per part is far and away the other extreme. Of course the number of subscribers to the Heterocera portions must be considerably below that of those who subscribed to the Palaearctic portion of the work, and even much below the number of those who subscribed for the butterflies only. Comparatively few work at the Lepidoptera of the World and the list of subscribers to the whole work would hardly be expected to much exceed the number of societies, public libraries, museums and such like. One could hardly expect the subscription to be the same as for the earlier portions, but four and a half times seems to be somewhat costly and more than commensurate with what one would think such decrease in the number of subscribers would warrant.

Vol. XXII. of *Boll. Lab. Zool. Gen. Agr.* of Portici, Italy, is to hand and contains about the usual number of well-illustrated articles descriptive of the most important and interesting investigations being carried on by the eminent biologists of the Institution. In the 320 pages there are seventeen memoirs, a good proportion of which deal with the material obtained by Prof. Silvestri during his travels a few years ago. Four concern the Homoptera of which three deal with *Coccidae*. Prof. Wheeler contributes one on the ants of China. Prof. Silvestri himself is the author of three papers. There is a paper on Spiders found in the caves of North America and Cuba, another on a parasite on Termites, another on the variation in *Adalia bipunctata* exhibited in experimental breeding, two papers deal with Coleoptera and the rest with the more obscure orders of insects.

In the *Soc. Ent.* for October there is an article discussing the question whether there are existing any hybrids between *Parnassius apollo* and *P. phoebus (delius)*. There are two plates to follow on which are figured 8 captured examples supposed to be hybrids, each showing a combination of characters of the two species.

M. J. de Joannis has commenced in the *Am. de Pap.* a series of useful notes on the Classification and Nomenclature of the *Pyræles* of France. No doubt English workers will find these of great use in their study of the British species most of which occur in France also.

His discussion of the name *Pyralidae* is quite interesting, in the light which he throws on the Nomenclature and methods of Linné.

The *Handbook of Practical Entomology* now being issued as a supplement to the *Ent. Zeit.* has reached page 128 of Vol. IV., the Bombyces, etc. Referring to *Samia cynthia* we have details of Distribution, Wintering stage, Food (20 foodplants), Ovum, Larva, Rearing, Hybrids obtained, Abnormal pairings (recorded 3), Time of Emergence, Notable observation (parthenogenetic development), and Parasites.

For some time past the *Insekten Börse*, one of the weekly sale and exchange magazines of the German-speaking portion of the continent, besides issuing as supplements the *Ent. Rund.*, the *Ent. Zeit.* and the *Soc. Ent.*, has devoted one page per number to a full account of the journeys by Herr Bodo v. Bodomeyer in search of insects of all orders to Asia Minor (1911), East Siberia and the Amur (1912), Tunis, Krumerie, etc. (1913) and Iran and Elburz Mts. (1914).

Mr. J. D. Gunder is contributing a series of most interesting accounts of "North American Institutions Featuring Lepidoptera" to the *Ent. News* of Philadelphia. The October number contains an account of the Barnes Museum of Lepidoptera, at Decatur, Illinois, with three plates, and is full of personal details of the life and entomological work of Dr. Barnes and of those who at different times have worked with him.

Dr. A. Seitz in the *Ent. Rund.* for October has contributed the first part of a sketch of the very large family of the *Pyralidae* and incidentally gives an account, with figures of the imago and larva, of the large S. American "micro" *Myelobia paleacea*, 130mm. in expanse and of wing form as robust as a Sphingid. The larva of this "micro" lives in the bamboo.

In the *Zeit. Oestr. Ent. Ver.* for October Dr. L. Müller contributes an article criticising and continuing the consideration of that by Dr. F. Heydemann in the *Int. Ent. Zt.* p. 249 etc., on the "Morphology, Biology or Breeding of *Dysstroma* (*Cidaria*) *truncata* and of *D. citrata*."

The October number of *Lambillionia* contains a useful plate of six striking aberrations recorded and described in the pages of that magazine at various times (1) A gynandromorph of *Colias croceus*, R. side ♂, L. side ♀. (2) *Euchloë cardamines* ab. *schepdaeli*, discoidal produced to the costa and continued basally. (3) *Aglais urticae*, ab. *pseudocomma*, costal and inner marginal spots united. (4) *Lymantria dispar* ab. ♂ *variegata* wings irregularly streaked. (5) Gynandromorph of *Dryas paphia*, R. side ♀, L. side ♂. and (6) *Melanargia galathea* race *malmediensis* very dark and marginal spots reduced. The number contains the sixty-first fascicle of the Addenda to the *Cat. Lep. de Belgique* of the late M. J. Lambillion, by M. F. Derenne, and valuable notes on the fauna of Belgium.

SOCIETIES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

The Annual Opening Meeting of the Winter Sessions of this Society took place on Tuesday, October 15th, 1929. The President, Dr. Willoughby Gardner, in the chair. It was reported that the Chester Society of Natural Science, Literature and Art had awarded to Mr.

S. Gordon Smith the Charles Kingsley Medal for his contributions to the knowledge of the Lepidoptera in the Chester Society's district, and to Professor R. Newstead the Mary Kingsley Medal in recognition of his contributions to our knowledge of the relation between insects and tropical diseases, and a vote of congratulation to each of these members upon the honour conferred upon him was carried with acclamation. The attention of the Meeting was next directed to the exhibition by members of the season's captures, in the course of which the adverse effect on collecting of the dry, hot weather was freely commented upon, many species having emerged considerable in advance of the normal dates for their appearance.

EXHIBITS.—By Mr. W. Buckley:—series of *Cyclopides palaemon* and *Ematurga atomaria* (yellow ground colour) from Northampton, a bred series of *Lasiocampa quercus* from Lindlow Common, and a fine specimen of *Acherontia atropos* from Nevin, N. Wales. By Mr. B. H. Crabtree:—a bred series of *Spilosoma menthastri* from Mullion Cove, with heavy markings showing a decided tendency to form a band across the middle of the forewings. By Mr. R. Tait:—bred series of *Boarmia punctinalis* (*consortaria*) from Tilgate Forest and of *Agrotis ashworthii* from Penmaenmawr larvae. From Church Siretton *Noctua rhomboidea*, *Aplecta nebulosa*, *Agrotis exclamatoris* (varied) and specimens of *Aplecta herbida* and *Noctua ditrapezium*. Also *Argynnis adippe*, *Cymatophora fluctuosa* and *Aplecta tineta* from Wyre Forest. By Mr. W. Mansbridge:—Series of *Boarmia repandata*, showing variation in the species, from Delamere Forest, and very dark type forms and varieties *nigricata* (*nigra*) and *ochro-nigra* from Western Ireland. *Eupithecia palustraria* (*pygmeata*), *E. denotata* r. *jasioneata*, *Chloroclystis rectangulata*, *Ypsipetes coerulata* (*impluviata*) and *Cymatophora duplicaris* (melanic forms) from West Lancashire. Also *Opotege crepusculella* from Woodvale, a species new to the Lancashire County list. By Miss J. L. M. Bird:—Series of *Melitaea athalia*, *M. aurinia*, *Hydrelia nuda* and *Acidalia imitatoria* from North Devon. By Mr. H. W. Wilson:—Bred series of *Pachygastria trifolii*, *Dasychira fuscelina*, *Agrotis praeceox*, *A. tritici*, (ranging from very pale to melanic forms), *Triphaena fimbria*, *Ennomos alniaria*: captured series of *Agrotis vestigialis* and *Hydroecia paludis*, and a specimen of *Hipoerita jacobaeae*, with smoky hindwings, all from the sandhills of South-west Lancashire. From South Devon bred series of *Lycaenopsis argiolus*, *Acasis* (*Lobophora*) *viridata* and *Dasychira pudibunda*, and a variable series of *Pararge aegeria*, bred from winter pupae. By Mr. R. Wilding:—Series of *Caenonympha tiphon* from North Wales and *Hipparchia semele* from Lancashire sandhills and the coleopteron *Cicindela sylvatica* from Bournemouth. By Mr. R. N. Snell:—Series of *Hemaris fuciformis*, *H. tityus* and *Notodonta trepida* from the New Forest; *Nola strigula* and *Angerona prunaria* (varied) from Abbots Wood. From Wirral, bred series of *Dejana falcatoria* and *Mamestra pisi*, and specimens of *Biston betularia* intermediate between *carbonaria* (*doubledayiaria*) and the type. By Mr. S. Gordon Smith:—A case showing the life-history of *Catocala nupta* the specimens mounted on bark to demonstrate the protective colouring of ovum, larva and imago. Mr. A. H. Williams, a junior member, exhibited a nice *Lasiocampa quercus*, variety *olivaceo-fasciata*, bred from a larva taken at Formby. Mr. H. B. Prince brought an exhibit of species of the genera *Papilio*, *Caligo*, and *Morpho* from the Amazon, collected by the Rev. A. Miles Moss.

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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata selected free of charge. These should be sent to Mr. Hy. J. TURNER, "Landscape," West Drive, Chesham.

Duplicates.—*S. Andreaeformis*. Ined 1928, well set on black pins, with date.

Desiderata.—Very numerous British Macro Lepidoptera. J. H. Redhouse, Hall House, Frances Street, Chesham, Bucks.

Desiderata.—URGENTLY REQUIRED. Hants records of Coccinidae (Hemiptera). H. P. Jones, Nat. Hist. Museum, Wollaton Hall, Nottingham.

Duplicates.—*Strangalia aurulenta* (Col.), Tenthredinidae and Aculeates.

Desiderata.—Species of Dolerinae and Nematinae (as flies not in my collection); not sent.—R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.

Duplicates.—Many species of Noctuae and selected forms.

Desiderata.—Early stages preferred. Opina, pupulae, gracula (Irish and Scotch and Manx), gothicina forms of gothica and selected unusual forms of insecta, gracula and munda.—A. J. Wightman, "Aurago," Bromfields, Pulborough; Sussex.

Signor ALFREDO FAZ, Calle Bandera 714, Santiago, Chili, is willing to purchase first class Chilean Coleoptera, especially *Carabus* spp., for striking Coleoptera from all parts of the World.

Galls.—In view of the forthcoming Monograph on British Zoo- and Phytococcus by Bagnall, Bartlett and Harrison, reprints of papers on, or records of, the latter plant galls are requested. Material will be willingly identified, acknowledged, and, where necessary, illustrated. Address such to: Prof. J. W. Heslop Harrison, D.Sc., F.R.S., Armstrong College, Newcastle-on-Tyne.

WANTED FOR CASH OR EXCHANGE.—Cryptocophalus of the Coleoptera Chrysomelidae. Will purchase or exchange. Send list of duplicates to: Paul N. Musgrave, 514, Mt. Vernon Ave., Fairmont, West Virginia, U.S. America.

CHANGE OF ADDRESS.—C. B. Williams, M.A., F.E.S., to 29, Queen's Crescent, Edinburgh, or Department of Agricultural Zoology, The University, George Square, Edinburgh.

D. G. Sevastopulo, F.E.S., c/o Ralli Bros., Calcutta, India.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. November 20th. December 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. November 28th. December 12th.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (except July and August). Visitors welcome:—Hon. Sec., A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

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All communications should be addressed to the Acting Editor, Hy. J. TURNER, "Latemar," West Drive, Cheam.

IMPORTANT

TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXVI.)

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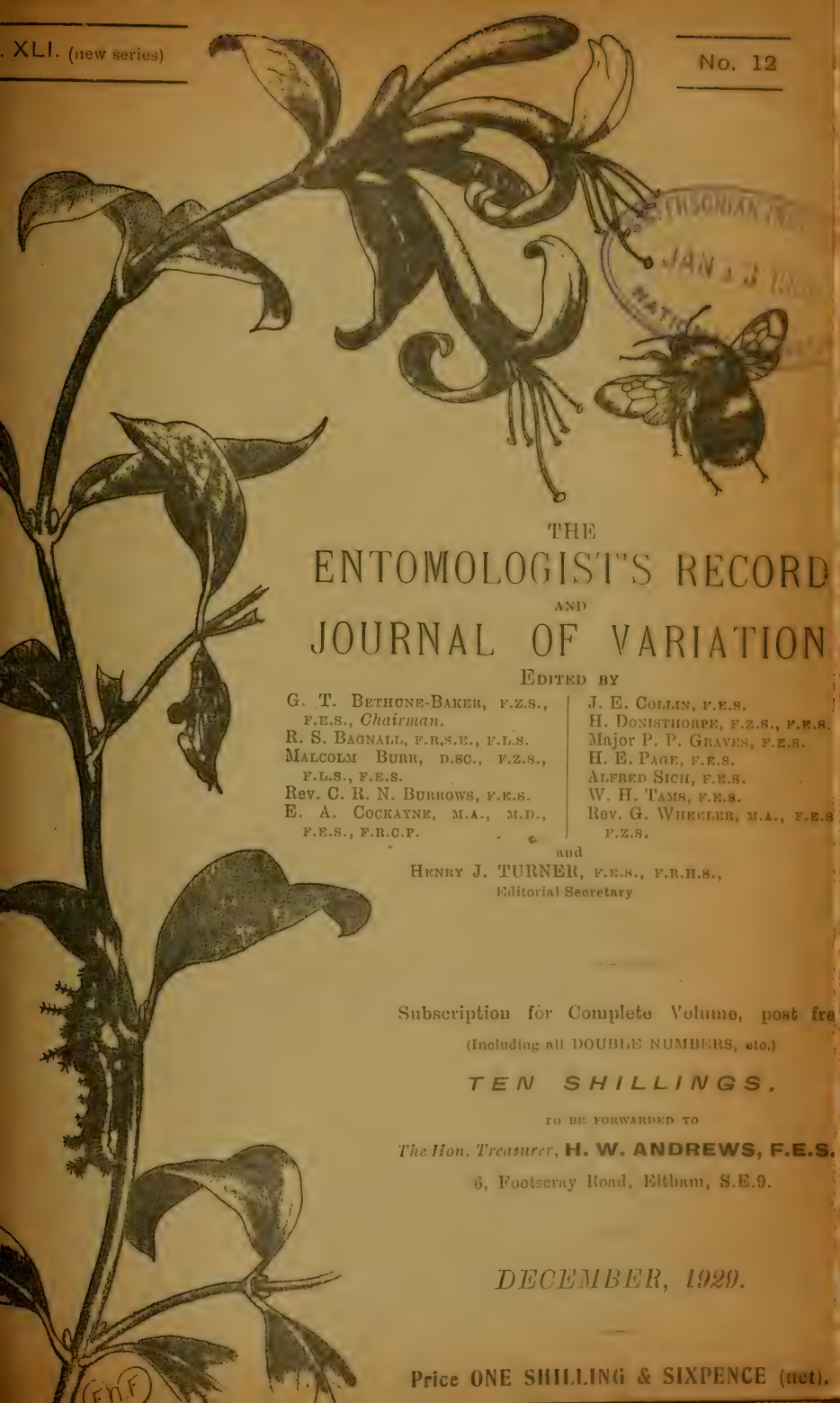
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Pieris brassicae, L. with special reference to aberrations from Aberdeenshire.

By G. S. GRAHAM-SMITH, M.D., F.R.S., F.E.S., and W. GRAHAM SMITH.

(Continued from p. 161.)

ABERRATIONS.

In the hope of introducing uniformity into the nomenclature of aberrations in the genus *Pieris*, Verity (1908, p. 166) suggested a series of names to designate similar aberrations in the various species. Unfortunately this excellent proposal has been completely overlooked by several recent observers, who have bestowed names, sometimes those of persons, on aberrations of *P. brassicae* without reference either to similar named aberrations in other species or to the work of previous observers. In consequence the nomenclature of these aberrations is confusing and synonyms have been created.

In the following pages we attempt to discuss all the aberrations with which we are acquainted, whether previously described or named for the first time by ourselves.

(a) IN THE MALE.

nigronotata, Jachontov (1903).

This aberration consists in the presence of a streak (Plt. I. fig. 3), or less commonly an oblong patch (Plt. I., fig. 1), of black scales on the upper side of the forewing of the male, beyond the discal cell and between veins 3 and 4. According to Jachontov it occurs at Nijni Novgorod in the spring brood only.

The aberration seems to occur in all races, in some rarely, in others very frequently.

It is present in 2 out of 9 males from Yunnan in the British Museum. Moore (1905) and Bingham (1907) state that it occurs occasionally in *nepalensis*, but 22 out of the 47 males in the B.M. and 26 out of the 67 males in the Tring collection from the Himalayan region show the aberration.

According to Graves (1925) it is frequent at Constantinople and occurs at Jericho, and 3 out of the 12 males from Asia Minor in the B.M. show the aberration. Verity (1911, Pl. XXXV., f. 14) figures an example from Cyprus, Turner (1920) mentions 3, and 5 out of the 7 males in the B.M. and 9 out of 14 in the Tring Museum from that island show the aberration. Gibbs (1920) stated that he had examples from North Africa, and there is one example among the 11 males from Tunis and Tripoli in the B.M. Two examples occur amongst the 8 males from Sicily in the B.M., and the museum contains a specimen from Corsica captured on August 6th, 1893.

The aberration seems to be very common in *wallastoni* from Madeira, all the 9 males in the B.M. being examples, and in *cheiranthi* from the Canaries, all the 17 males in the B.M., and all the 16 males in the Tring collection being examples.

In Europe the aberration appears to be uncommon, only 2 examples being noted among 158 males in the Tring collection.

In the British Isles the aberration seems to be regarded as rare. It has been known, however, for at least 200 years, for Albin (1720)

says, "Mr. Derham has observed some of the *males* to have one spot on the upper side of the upper wing." Stephens (1828, p. 16) described it under the name of *P. brassicae*, var. β . Image (1897) exhibited males "with a black spot on the disc of the forewing. They were bred from larvae found feeding on *Tropaeolum* at Lee, N. Devon, in the autumn of 1896, and six out of the ten males showed the variation." Mosley (1903) says he "had the good fortune" to breed a male with a small black linear spot on both forewings. Pickett (1903) bred a specimen in the same year. Buckstone (1923) exhibited a specimen from Eltham, and Greer (1927) bred an example "with well-marked discal spots on the forewings" from a pupa found in E. Tyrone.

The series in the Tring and B.M. collections, which however may be selected, seem to indicate that the aberration is more common than the references in the literature suggest. In the former collection 23 out of 116 British males are examples, while in the latter 10 out of the 34 "spring" males from various parts of England show the aberration, though none of the 32 "summer" males do so. None of the 15 males from Scotland show it, though one of the 7 males from Ireland is an example. Five out of the 19 males in the Blackburne-Maze collection at Cambridge, which were collected in 1890 and 1891, during April and May, in the South of England, show the aberration.

In the present series 1.7 per cent of the males show the aberration. The linear streak seems to be constant in the allied *P. deota* of the Pamirs.

bi-nigronotata (ab. nov.).

Besides a linear streak as in ab. *nigronotata*, there is on both forewings a similar but smaller, streak between nervures 1 and 2. (Plt. I. fig. 2).

The only example observed by us occurred in this series. This specimen also exhibits on the upper surfaces of both underwings a series of black scales about 1mm. from the margin between the interneural folds on each side of nervure 6 (=ab. *marginata*).

marginata (ab. nov.)*.

A band of dark scales, either connected with the costal spot, or separated from it by the following interneural fold, runs parallel with, and distant about 1mm. from, the outer margin of the upper surface of the hindwing, sometimes as far as the extremity of the interneural fold between nervures 5 and 6 (Plt. I. figs. 2, 3). We have not noticed this aberration in the female (see ab. *punctigera*, ♀).

This aberration seems to be common in some Himalayan localities. In the B.M. series it is well marked in 4 out of 7 males from Thibet, in the single male from Bhotan, in one of the 4 males from Sikkim, and in 8 out of 33 males from other North Indian localities. In the Tring collection it was present in 2 out of 37 males from Thibet, and in 8 out of 27 males from North India, and in one of the two Indian males in the Cambridge collection. Three of the 9 males from Yunnan in the B.M. series show it slightly, but it was noticed in only one specimen,

* We have noticed this aberration in the first generation of *P. rapae* from Aberdeenshire, and suggest that the same name be applied to it. ab. *marginata*.

a male from Cyprus, in the series from other regions. In the Tring collection, however, it was noted in 9 out of 158 European males. It was not noticed in any specimen of *cheiranthi*.

In the British Isles Chapman (1902) exhibited a specimen "with a black marginal line on the hindwing," and in the Tring series of 116 British males there are 15 examples, 7 slightly, 6 moderately and 2 very well marked.

In the present series there were two very faintly marked examples, both showing other aberrations (*nigronotata* and *bi-nigronotata*). In each case a narrow band, composed of about 50 black scales, extends between the interneural folds on each side of nervure 6.

Such a streak is present in the male of *P. deota*, but it is continued further round the wing, and is broken into sections by the tips of the interneural folds.

fischeri, John (1922).

In this aberration the costal spot on the hindwing is absent.

(b) IN THE FEMALE.

biligata, Cabeau (1925).

In this aberration, as described by Cabeau, the apical blotch is joined to the upper discal spot by lines of black scales along nervure 3 and 4 (Plt. II. figs. 14, 15). In better developed examples there are dark, tooth-like projections from the apical blotch, which gradually diminish in size and reach as far, or nearly as far, as the upper discal spot (plt. II. fig. 19). The outer part of the space between the teeth is usually suffused with black scales and sometimes the suffusion extends to the discal spot (plt. II. fig. 20). Very rarely the whole area is so black that the spot appears to be continuous with the apical blotch (plt. II. fig. 21).

The aberration is well-known and is usually described by such phrases as "teeth," "extended dashes to the black spots," etc.

The aberration occurs occasionally in all seasonal forms and races, is very common in *wollastoni* and *cheiranthi*, and is almost constant in *nepalensis*.

In the B.M. series of 39 females from the Himalayan region 37 are examples of *biligata*, and of these 15 are also examples of *fasciata*. In one of the specimens from Kujian the black scaling is so intense that the upper discal spot is continuous with the apical blotch. In the Tring collection all 13 females from Thibet and 11 out of 21 females from North India are examples.

In the Tring collection 6 out of 14 *cheiranthi* show the aberration, while all the 16 females in the B.M. collection show it more or less markedly, and it is present but to a less extent in most of the female *wollastoni*.

The aberration seems to be not uncommon in females from Cyprus (Turner, 1920) but seems to be uncommon in European specimens. Lowe (1915) records a female from Guernsey "with a widened black border with extended dashes to the two black spots on the disc—these are also united by a black suffusion."

In the British Isles it seems to be regarded as uncommon. Carpenter (1907) records an example "with the discal spot connected with the apical patch." Frohawk (1914 pl. 3 fig. left side) figures

an example, and Greer (1922) records a female from L. Tyrone "with the discal spots united to the apical blotch by a suffusion of black scales." In the B.M. series of 80 females only 4 examples were noted, but there are 10 well-marked and 10 poorly marked examples among the 138 females in the Tring collection. In this series 1.3 per cent. of the females show this aberration.

The aberration seems to occur commonly in *P. deota*, and occasionally in *P. canidia*.

This aberration often occurs in conjunction with the aberration *fasciata* and for such specimens Verity (1908, p. 166) has suggested the name *conjuncta*.

*posteromaculata**, Verity (1911, p. 337).

Synonym: *nigro-punctata*, Walcourt (1920).

In this aberration a dark round spot, due to the presence of a group of black scales covered to a great extent by white scales, is found between nervures 3 and 4 on the upper surface of the hindwing (plt. II. figs. 15, 20).

Walcourt, who regards the aberration as rare, states that he bred an example from a Belgian pupa on July 27th, 1919, and has seen two examples in the Brussels Museum. Among the non-British specimens in the B.M. and Tring collections we observed only one example, a female from Sikkim, but it is probable that other examples were overlooked.

In the British series of 84 females in the B.M., 4 examples were noted, and 14 among 138 females in the Tring series. Frohawk (1914, pl. 3, fig. 21) figures a female, taken at Liverpool on July 25th, 1906, showing this together with other aberrations.

In the present series the aberration was present in 2.6 per cent of the females, but was not noticed in the males.

It is interesting to note that it is common, if not constant, in the female *P. deota*, and is present on the underside in the male.

punctigera (ab. nov.).

Black spots or radial streaks are present at the ends of the nervures on the upper surface of the hindwing (plt. II., fig. 21).

This aberration seems to be rare, but is sometimes seen in Himalayan specimens. In the allied *P. deota* and *canidia* it is constant and well marked.

reducta, Fritsch (1913).

In this aberration the lower discal spot on the upper side of the forewing is absent, but both the upper discal spot and the club-shaped mark are present. The presence of the latter at once distinguished it from ab. *nigronotata*. We have not observed an example of this aberration.

glasevi, Müller (1924)

In this aberration the club-shaped mark on the forewing is absent. We have not observed an example of this aberration.

* This aberration occurs in *P. rapae* in which it is known as ab. *nigropunctata*, Lambillion (1906), and in *P. napi* in which it is known as ab. *postero-maculata*, Reverdin (1910).

colliurensis, Gelin (1914).

Synonym: *fischeri*, John (1922).

In this aberration both the club-shaped mark on the forewing and the costal spot on the hindwing are absent.

The example described by Gelin was very small (46mm.). In John's specimens the apical blotches were pale and reduced in size and the discal spots were small and dusted over with white scales. Some of his examples also exhibited the aberration *rammei*.

We have observed no examples of this aberration.

postice-ochreata, Verity (1919, p. 88).

"Female individuals of the first brood with the upper side of the hindwings of a bright ochreous colour; they occur frequently in northern races (Britain included), but I have never seen a southern specimen."

Stephens (1828, p. 16) described this form under the name of *P. brassicae*, var. γ .

(c) IN BOTH SEXES.

chariclea, Stephens (1828).

"Very early in April at Hertford" in 1827 Stephens (p. 17) captured together with typical *P. brassicae*, specimens which were smaller and "with the tip of the anterior wings ash coloured, without any internal indentations, in the female deeply coloured within with black and margined without in both sexes by immaculate yellowish-white cilia . . . beneath, the posterior wings deep yellow, very thickly powdered throughout with minute dusky or black scales." These he regarded as belonging to an allied species and figured (Pl. III, f. 1, 2,) under the name of *Pontia chariclea* var. *a*.—"The chief points of discrimination between this species and the preceding insect consist in its inferior size, the dissimilar colour of the apical spot on the anterior wings above, and the integrity of its inner edge, the pale cilia with which it is fringed, and the deeper colour, and more thickly irrorated under surface of the posterior wings."—He records that his attention was first directed to the problem by seeing specimens of *chariclea* taken in the spring in Derbyshire in the collection of Haworth, "who hinted his suspicions that they might eventually prove distinct from *brassicae*."

Next year (1828, p. 146,) he received from W. T. Bree numerous specimens captured near Coventry between April 28th and May 17th, "some having the tops of the anterior wings deep black, others pale cinereous, and some clouded as in the figure already given, with many intermediate shades; but *all* invariably have that part internally entire, as previously described. Again, the specimens vary much in size, some being fully as broad in expanse as *Po. brassicae*, others considerably smaller." He also received ten pupae, "found in that state during the winter." Of these eight emerged before May 20th, and "produced *Po. chariclea*; whereas the other two, which came out subsequently, produced *Po. brassicae*." He says that in spite of these variations his "opinion respecting the distinction of this insect and *Po. brassicae* remains unshaken."

A hundred years earlier Albin (1720, Pl. I, fig's. *c*, *c*.) had illustrated, under the name of *Papilio albus vulgaris major*, a male and a female,

which had emerged in April, with tips externally grey, which seem to be examples of Stephens' *chariclea*. Humphreys and Westwood (1841, Pl. IV.) contrast in a beautifully coloured plate *P. brassicae* and *P. chariclea*, but say that "no difference has as yet been satisfactorily ascertained in the respective caterpillars, which would determine the point whether *P. chariclea* is to be considered a distinct species or a mere variety," but later Westwood (1855) definitely considers *chariclea* to be a variety.

Since it has been demonstrated that the insect described by Stephens is not a distinct species, but the most common of the forms occurring in the first generation, the name *chariclea* has been employed in two senses:—(1) to designate specimens having the characters described by Stephens=*ab. chariclea*, Steph., and (2) to indicate the spring or first generation of the northern race *brassicae*, irrespective of the markings =*f. chariclea*.

vasquezi, Oberthür (1913).

Synonym: *henriettae*, Pionneau (1924).

The apical blotches of the forewings are wholly ashy-grey in colour, contrasting with the black discal spots.

The aberration, which was described by Oberthür from a spring female taken near Madrid, is due to such increase inwards of the white scaling found in the distal area of the tip in *chariclea* that the apical blotch appears grey. As first pointed out by Stephens (1828, p. 146) transitional forms occur, and these are common in Southern Europe. Graves (1925), for example, says that "the spring specimens in the Near East are characterised by the frequency of the form *vasquezi*, Obth., or transitions thereto," and Verity and Querei (1923) state that "in the South of Europe it (*brassicae*, Gen. I.) differs from *chariclea*, Steph., in the lowlands, chiefly in consisting of individual forms transitional to *vasquezi*, Obth. . . . and by producing well developed ones of the latter quite frequently."

Not a single example was noted by us in the B.M. or Tring series from Madeira, the Canaries, or the Himalayas.

Verity (1916) says "the beautiful form of the spring generation, with the apical crescent completely suffused with white scaling, so as to give a pale grey look, which contrasts sharply in the female with the black spots of the disc, is certainly very rare in the British Islands, if it occurs there at all, for I have never seen a British specimen of it." The form, however, does occur in the British Isles for it was first clearly described by Stephens (1828, p. 17) as *P. chariclea*, Var. *g*. "with the apical spot of the anterior wings unclouded, very pale, cinereous, and the female with two transverse and an obsolete clavate black spot above. In the collection of Mr. Haworth." He also mentions (p. 146) other specimens with the tips of the wings "pale cinereous."

In the B.M. British series of 88 males and 84 females there are two doubtful males and three well-marked female examples, all belonging to the spring brood. In the Tring series of 116 males there are 10 examples, mostly however, with very slight darkening of the inner border of the blotch and among the 138 females 10 similar specimens and 3 from Westcliffe (v. 1913) with the tips wholly ash-grey.

In the present series there was one female example (plt. II. fig. 22) with the inner border of the blotch slightly darkened.

fasciata, Kiefer (1918)*.

Synonyms: *alligata*, Cabeau (1924).

maria, van Mellaerts (1926).

In this aberration the discal spots of the forewing tend to be united by the development of black scales between them. Since in the female it may occur either on the upper surface, or on the under surface, or on both, it seems desirable to introduce the distinguishing terms **supra-fasciata** and **infra-fasciata**.

In the normal female the upper discal spot is usually sharply limited above by the 4th and below by the 3rd nervure, and the lower spot is sharply limited above by the 2nd nervure. On the underside the spots in both sexes are similarly limited. Any development of black scales, even a few, in the inter-space bounded by the 2nd and 3rd nervures, which tend to unite the spots, may be considered as a slight form of the aberration. In the slighter forms some black scales are developed just below the upper and just above the lower spot with a wide interval between them. In the more advanced forms the groups of black scales tend to unite across the inter-space, and form a band, in parts nearly as broad as the upper spot but in all cases, except many examples of *cheiranthi*, this band is definitely divided by the inter-neural fold, which traverses the inter-space. In well-marked examples the appearance of a chain of four spots, the two discal spots and between them two spots separated by the interneural fold is produced (plt. II. figs. 13, 14, 15, 16, 17, 19). Occasionally the lower discal spot is itself partly or wholly divided by the interneural fold in the space between the 1st and 2nd nervures, as is very frequently the case in *P. rapae*.

In the male the aberration occurs on the underside only (plt. I. fig. 10).

In most cases in the male there is also a dusting of black scales connected with the lower discal spot below nervure 1 extending about 3mm. towards the base of the wing. This streak of dusting, which corresponds with the club-shaped mark on the upper surface in the female, is occasionally represented by a few dark scales on otherwise normal males (4 out of 28 examined). In female examples of **infra-fasciata** a similar, but more extensive, dusting occurs, but traces seem to be present in many normal specimens.

Although the aberration was well-known and described by such phrases as "a suffusion of black scales," etc., it was first named by Kiefer from a female captured in the Seckauer Alps.

The aberration occurs occasionally in all seasonal forms and races, almost constantly in *wallastoni* (plt. II., fig. 19), and reaches its greatest development in *cheiranthi* (plt. I., fig. 11; and plt. II., fig. 16).

* Tutt (1896, p. 232) gave the name *fasciata* to a similar aberration in *P. rapae*, saying: "Aberrations have been recorded of an uniform dusky brown colour on both sides of the wings, and the spots on the forewings occasionally attempt to unite to make a band across the wing (ab. *fasciata*)." This clear statement has been misinterpreted both by Verity (1908) and by Rober (1907) as indicating that *fasciata* in this species is of a brown colour.

In the B.M. series of *cheiranthi* all 16 males show the aberration, very well-marked, on the underside, and all 16 females on both sides. Of the 9 male *wollastoni* 7 show the aberration on the underside and all 20 females on both sides. Of the 50 males from the Himalayan region 5 show the aberration on the underside, and of the 39 females 22 show it, 7 on the upper, 7 on the lower and 8 on both sides. In the Tring collection, however, only 3 of 34 Indian females show it on the upper side. In the B.M. collection of the 7 males from Cyprus 2 show it on the underside, and of the 7 females none on the upper and 4 on the under. Of the 16 males and females from Syria only one female shows it, on the underside. The aberration is not present in 40 specimens from Tunis, Tripoli, Sicily and Malta. In the Tring collection none of the numerous specimens from Morocco or of the 14 (upperside) females from Cyprus show it, and it was only noted in 6 out of the 237 European females. Lowe (1915) records a female from Guernsey with the discal spots "united by a black suffusion."

In the British Isles the aberration seems to have been recorded very seldom. Frohawk (1914, Pl. 3, fig. 21,) figures a fine example and states that "occasionally the black spots are united by a dark band." Later (1918) he exhibited "a series . . . showing gradation in the development of a band on the forewings." In the B.M. series of 107 females 4 show the aberration strongly marked and 4 weakly on the upper side. One male shows it strongly marked on the underside. In the Tring series of 138 (upperside) females there are 35 examples, 7 being well marked. Of the 28 (underside) females 15 show this aberration, which however is well marked in two only. Among the 39 (underside) males 3 show the aberration poorly and in 1 it is well marked.

In the present series it occurred in 1 per cent. of the males and in 9.5 per cent. of the females (see p. 159).

(To be continued.)

Description of the Larva and Pupa of *Phobetron coras*, Cram. A Limacodid from the Argentine.

By K. J. HAYWARD, F.E.S., F.R.G.S.

Whilst wandering around the garden on New Year's day, 1929, I noticed a curious spiderlike insect on a leaf of *Citrus* (Tangerine), and immediately recognised it for a Limacodid-like larva.

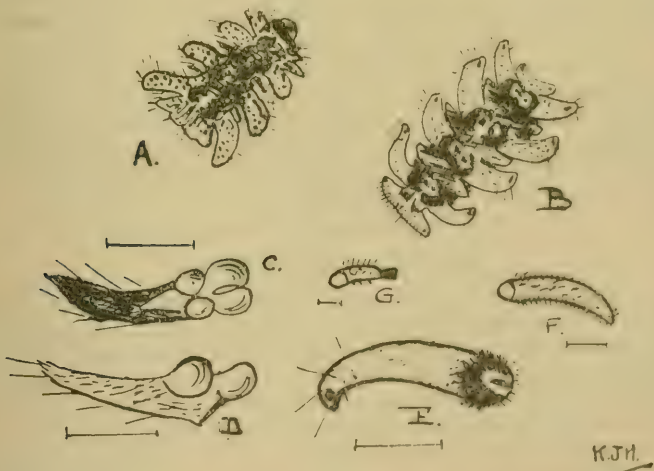
It being rather difficult to describe this larva clearly I made two rough sketches, that marked "A" being a larva I found the following day and in an earlier stage, "B" a larva slightly before pupating. The sketches are very rough but it is hoped that they may assist—with the following description—the identification, in the future, of this larva.

The colouring in the penultimate stage is light yellowish buff with dark brown markings "peppered" all over the primary processes. In the final stage the colour light brownish buff with practically no brown markings other than the circular markings afterwards described.

In both stages there are four primary processes (see sketch), these appendages curving back from the head end and being slightly recurved. These are loosely fastened to the body wall along the dorso-median

line. Between these primary processes are secondary processes consisting of conical sacs of some viscous or gelatinous substance, mahogany brown in external colour, and with very short hairs. In the earlier stages these are short and terminated by a thick tuft of short black hairs, in the later stage about half the length of the primary processes and slightly back-curved. These secondary appendages are loosely attached to the body wall slightly below the dorso-median line. In both stages there is a frontal process as shown in the sketch, and an anal appendage in the earlier stages which is almost completely eliminated in the final stage. These join the body on the same line as the primary appendages, whether they are firmly or loosely fixed I cannot say. Below all these appendages there is a lateral row of tufts of short hairs of the ground colour as follows.—A frontal series of six small tufts, a double tuft of larger size, and then seven further larger tufts of slightly lighter colour. The appendages and remainder of the dorsal and lateral areas covered with short hairs, so closely as to appear like fine velvety fur. There is a series of brown spots, circular in shape, and shading lighter inwardly, on the "shoulder" of each of the primary appendages, a smaller somewhat similar spot at the base of each secondary process, these circular markings having a dark spot more or less on the inner circumference. In both stages there is a black spot at the extremity of each process. In the earlier stage the larva with numerous long light coloured setae, in the later stage these are reduced to a series along the outer edges of the primary processes. In the later stage the circular markings on the "shoulders" of the primary appendages are slightly tufted along the outer circumference.

Beneath sluglike with only rudimentary legs, the clasping process being like that of a slug.



LEGEND.—A. Larva, early stage. B. Larva final stage. C. Primary appendages below. D. Primary appendages side view. E. Primary appendage from above. F. Secondary appendage of the final stage. G. Secondary appendage of the penultimate stage.

In walking, the larva at times "rolls" its superstructure from side to side which probably adds to its mimicking effect, more approaching the gait of the spider.

The primary and secondary appendages are very loosely fastened and drop off (or are shed) at the slightest provocation. These processes appear sacs of jelly or some similar matter, and are only hair-clothed in their exposed parts. They are terminated in a sort of double condyle which fits into a cavity in the body wall, and their detachment from the insect's back does not appear to cause the larva any inconvenience or discomfort. In the pupal state they are simply shed and act as some sort of camouflage to the pupa as they dry up.

Feeds on *Citrus* (Tangerine), lying along the upper side of the leaf and eating the edges, usually from the point of the leaf backwards. I found a pupa of this species in the fork of a young *Citrus* (Sweet orange) in Villa Guillermina on January 10th, so possibly it is a general *Citrus* feeder.

The pill-box in which I fed up the larva always had a curious sweet smell, in part due to the nature of the foodplant, but I cannot help feeling that there is a certain amount of "scent" emitted by the larva.

The pupa is simply a roundish case closely covered with the ochreous skin hairs and dried-up processes of the living larva, and in size is about that of a very large pea.

Larvae pupated January 6th, and emerged after 19 days.

Imago sent to B.M. under number 7020 and empty pupa case under No. 7021. One specimen of the larval state was placed in alcohol and sent to the B.M. under No. 7022.

It is perhaps unnecessary to note that processes lost in one of the earlier stages are not reproduced again in the later stages. When the time for the change comes, the insect lies up for about three days, at the end of which time the new coat has arrived and the old skin is completely shed, the processes adhering together so that there appears to be a shrivelled larva in the breeding box.

The pupa found at Villa Guillermina yielded an ichneumon which emerged on January 30th. There is nothing to show how long this parasite remained in the pupal state, but judging from the eaten leaves of the *Citrus* and the state of the pupa when found, I should estimate the time as between 25 and 30 days. The insect was forwarded to South Kensington under number 7023.

New Forms of Lepidoptera.

In vol. II. of the *Bull. Soc. Ent. Bulg.* a new subspecies of *Euchloe gruneri* is described by Dr. Iw. Buresch as *macedonica*. It occurs in the area of North Macedonia and is characterised "The males have the yellow area distinctly black margined on the inner side. The females have a strongly developed discal mark." In the typical males the inner margin of the yellow area is not margined with black.

In vol. XIII. of the *Mitt. Münch. Ent. Gesell.* p. 8 (1923) is described a new aberration of *Lomaspilis marginata* in which the fringes are either snow-white or white chequered with black. It is named *albociliata* by the writer Dr. Hörhammer. This name should be added to my list of British Geometers. Another named form has also been

omitted ab. *wendlandtiata*, Fuchs, in which the whole of the fringes on all four wings is black. There is a figure of this ab. in *South's Moths of the Br. Is.* Vol. II. pl. 107, fig. 2.

The following new forms are described and named in vol. XIV. of the same *Proceedings* (Mitt.).

Calymnia pyralina ab. *arnoi*, Schaw. — A reddish brown female, with distinct rosy-brown forewings from Waidbrüch, Dolomites.

Colias croceus f. *tergestina*, Stdgr. — Ground colour citron-yellow from the Transcaucasus.

Colias hyale subsp. *irkutskana*, Stdgr. — The colour as in ab. *heliceides* pale greenish yellow, the apex on the upperside much reduced and bestrewn with light scales, so that it appears uniformly grey. Discal point very small. The hindwing upperside without black margin, the central spot obsolescent, the underside of which appears just as dull on account of the pale ground. From the base of the hindwing above runs a dark grey wedge towards the outer margin. The undersides remain uniform in colour and marking.

Colias phicomone ab. *phacdra*, Schaw. — It is wholly light bright greenish yellow, and has a strong black outer border on the fore and hindwings with only (especially on the costa) rudiments of the inner black edging of the marginal band, which is wide light greenish yellow as is the ground colour and with which (except on the veins) the whole forewing is suffused, without any black mixing in the clear yellow green in the hinder half. The hindwing is also unicolorous pale yellow green. The wide clear marginal band is not separated from the rest of the clear not blackish wing. The discal spot extremely pale yellow. The fine veins of the wings are especially marked, each having black powdering.

Erebia ligea ab. *reisseri*, Schaw. — Ground colour pure black, not so brown black as typically. On both fore and hindwings the band, in which the eye spots stand is not red brown but quite light yellow-ochre, somewhat tinged with grey. The band on the forewing underside is even lighter, almost whitish. The eye-spots above and below are normal and also the white band on the underside of the hind-wing.

Erebia pronöe, race *gardeina*, Schaw. — They are extremely black, rarely have a small trace of the rusty brown (not red) band with extremely small, rarely white centered eye-spots on the forewings and none on the hindwings upperside. On the underside the band of the forewings is dusky brown with obsolescent little eyes. An invariable dusky hindwing is the rule with rare exception. The upperside mostly has only the smallest trace of brown around the tiny eyes, or with this without the eye, or even only the tiny eyes without brown around. The underside has no trace of the tiny eyes in the very dusky band. The females are naturally lighter than the males although very closely resembling them. Dolomites. An aberration completely without white centres to the eyes is named *depuncta*, Schaw., and another aberration with a rusty-brown trace around two white-blue not black ringed eye pupils is named *leucophthalma*, Schaw. Another form a ♂ quite without eye-spots and no trace of the rusty-brown above is named *nocturna*, Schaw.

Libythea celtis ab. *conjuncta*, Schaw. — The apical yellowish quadrate spot is in direct conjunction with the large middle spot while usually it is widely separate from it.

Polyommatus damon race *ultramarina*, Schaw.—Ultramarine blue deeper than the light, green-blue of the Lower Austrian ♂. Tyrol.

Melanargia japygia = *russiae*; two forms of the subsp. *suvarovius*.—(1) With an additional eye in the apex, ab. *bioculata*, Staud., and (2) with an additional eye on both upper and underside of the hindwing in cell III.

Nisoniades tages f. *posticeprivata*, Staud.—All the light marginal dots on the hindwings are absent. N. Tyrol.

Pararge megera ab. *triocellata*, Salzl.—A form with two additional white-centred eye-spots below the apical spot both above and below.

Parasemia plantaginis ab. *aurantiaca*, Schaw.—Orange-red or orange-yellow on the hindwings; the pure yellow being ab. *lutea* and the blood-red the nominotypical form.

Satyrus dryas ab. *caeca*, Schaw.—In which the blue centre of the apical eyes is not apparent and both eyes appear pure black. ♂. Dolomites.

NOTES ON COLLECTING, etc.

VANESSA ANTIOPA AT CHICHESTER.—A fine *Vanessa antiopa* was seen this autumn on three different occasions by Mr. Gumbleton in his garden at Goodwood near Chichester.—JOSEPH ANDERSON, CHICHESTER.

HERSE CONVULVULI AT DORKING.—A fine male *Herse convolvuli* was brought me the other day which had been captured among the coal heaps at Dorking, Surrey, a few weeks ago. The condition was a credit to the captor who had stuck a pin through its head, to secure it, leaving the thorax intact.—HY. J. T.

COCCINELLIDS AND HIBERNATION.—My friend, Mr. Horace Donisthorpe, knowing my weakness for any data on the habits of Coccinellids, has sent me a newspaper cutting, which records so unusual a site for hibernation that I think it is worth recording this in a less ephemeral journal. It appears over the nom-de-plume of "Peter Simple," but I have no reason to think the account is other than genuine. I cannot do better than quote his words:—

"Where do ladybirds go in the winter," asks a Maidenhead correspondent. "I have a herd of Kerry cows and, as perhaps you know, they are jet black. One morning recently my cowman called my attention to a bright red spot on the tail of one of them, near the root. At first I thought it was a sore place, but on closer examination it turned out to be a cluster of ladybirds nested in the hair—evidently meaning to pass the winter there. My cowman however had other ideas on the subject, and they were ejected. Ladybirds are sometimes found in curious places but in the above instance they chose one with central heating installed."—G. C. LEMAN, F.E.S.

CURRENT NOTES AND SHORT NOTICES.

Our Treasurer, Mr. H. W. Andrews is anxious to hear from a few subscribers to the present volume. He has to render his accounts at the editors' meeting in January, and he is desirous of again showing, not a balance, but that "both ends meet."

Entomological Society of Hampshire and the Isle of Wight. *County List of Lepidoptera*. Mr. W. Fassnidge, 47, Tennyson Road, Southampton, is revising the list published by the Society a few years ago; he is also extending the same by including the Family *Tortricidae*. Will Members and all who can help send direct to Mr. Fassnidge additions and corrections to this List which have come to their notice; and all Hants records of *Tortricidae* which they have. Copies of the present List can still be obtained, price 2 6, post free 2 8, from Mr. Fassnidge. No doubt many of our readers have records of *Tortricidae* from Hampshire especially from the New Forest area which would be of the greatest use for this compilation.

A meeting of the Entomological Club was held at the Zoological Museum, Tring, on October 26th, 1929, Lord Rothschild in the Chair. Members present in addition to the Chairman:—Mr. Robert Adkin, Mr. H. St. J. Donisthorpe, Prof. E. B. Poulton, Mr. H. Willoughby-Ellis, Mr. J. E. Collin and Mr. W. J. Kaye. Visitors present:—Sir P. Chalmers Mitchell, Mr. S. Edwards, Mr. W. P. Pycraft, Capt. N. D. Riley, Capt. A. F. Hemming, Mr. Philip Graves, Mr. W. Rait-Smith, Mr. H. McD. Edelsten, Mr. W. H. T. Tams, Dr. F. A. Dixey, Com. J. J. Walker, Rev. George Wheeler, Major. S. S. Flower, Mr. H. E. Andrews, Dr. S. A. Neave, Mr. E. Ernest Green, Dr. K. Jordan, Mr. G. C. Leman, Mr. A. Hall, Mr. H. T. G. Watkins, Mr. J. C. Wainwright, Mr. John Levick, Mr. C. H. Lankester, Dr. E. A. Cockayne, Dr. J. Waterston, Dr. A. D. Imms. The guests began to arrive soon after eleven o'clock and were received by Lord Rothschild. Before and after luncheon they inspected the Lepidoptera exhibited for the purpose of this meeting, and a few of the guests, who had not seen the other departments of the Museum, or had not been at Tring for a number of years, were conducted by Lord Rothschild over the Public Museum and the bird collection. The Public Museum (*i.e.*, the portion of the Museum open to the general Public) contains a general zoological collection and is rich in many choice specimens and in certain special groups, such as Antelopes, Cassowaries and Giant Tortoises. The exhibition of Lepidoptera consisted of 109 drawers of British *Sphingidae* and *Bombyces* (in the old wide sense), a drawer with four British black *Papilio machaon*, and the collection of *Delias* arranged in 75 drawers. *Delias*, a genus entirely restricted to the East, occurring from Ceylon and North-west India to the Solomon Islands, contains a large number of species, most of which are characterized by beautiful red markings on the underside of the hindwing, the upperside, as a rule, having the usual Pierid colouring, white with black outer area. In most species the sexes are nearly alike as shown in the exhibit, the males on the whole having rather more restricted black on the upperside than the females. But very conspicuous sexual dimorphism also occurs, particularly in New Guinea, a country where the species are singularly numerous in the mountains, more numerous than anywhere else, as was well demonstrated by the exhibit. The collection contains nearly all the species and subspecies known, and quite a number of them are represented in no other collection but that at Tring, as for instance *Delias inexpectata*, *D. klossi*, and *D. wollastoni*, which Lord Rothschild described each from a single specimen picked off human faeces by Mr. Boden Kloss in the Pigmy country in Dutch New Guinea. The

British Lepidoptera exhibited are especially remarkable for the numerous representatives of melanism and the great variety of individual aberrations. Each species is accompanied by the parasites, which are known to infest the eggs or caterpillars. The four British black *P. machaon* comprise both sexes. Luncheon was served at one o'clock after which the Entomological Section of the Museum was again much enjoyed and the members and guests departed in the late afternoon.

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IMPORTANT

TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXVI.)

CONTENTS OF Vol. I. (Most important only mentioned.)

GENUS *Acronycta* and its allies.—Variation of *Smerinthus tiliae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthenie*, and *aurelia*—The Doubleday collection—Parthenogenesis—Paper on *Taeniocampidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the inter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist or 1890—Lifehistories of *Agrotis pyrophila*, *Epunda lichenea*, *Heliophobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc., 360 pp.

CONTENTS OF VOL. II.

MELANISM AND MELANOCHROISM—Bibliography—Notes on Collecting—Articles on VARIATION (many)—How to breed *Agrotis lunigera*, *Sesia sphegiformis*, *Taeniocampa optima*—Collecting on the Norfolk Broads—Wing development—Hybridising *Amphidasys prodromaria* and *A. betularia*—Melanism and Temperature—Differentiation of *Dianthracias*—Disuse of wings—Fauna of Dulwich, Sidmouth, S. London—Generic nomenclature and the *Acronyctidae*—A fortnight at Rannoch—Heredity in Lepidoptera—Notes on Genus *ZYGÆNA* (*Anthrocera*)—Hybrids—Hymenoptera—Lifehistory of *Gonophora deraea*, etc., etc., 312 pp.

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[11. *S. (A.) opacula*, Zett.—Lateral margins of corium narrowly and evenly pale (yellow) except at base, and extreme apex; disc of corium more or less spotted. Scotland].

[10. *S. (A.) setulosa*, Put.—Allied to *opacula*, but head, pronotum, and elytra thickly covered with long erect blackish hairs. Face darker, yellow markings characteristic of *opacula* much obscured with black; 2nd antennal joint longer, black at base and apex, flavous in middle. So far only recorded in Br. from Dorset: Poole harbour, one ♂, Aug. 04., amongst flood refuse (E. A. Butler.)]

[15. *S. (A., subg. Micranthia, O.C.) marginalis*, Fall.—Lateral margins of corium ochreous, the colour not quite reaching the base, wide at its origin, then much narrowed, and dilated across the apical angle of the corium. Disc of corium unspotted, with very minute patches of silvery hairs. L. 3mm., or less. Unnaturally placed here although it is difficult to assign to it any particular position. Damp places on heaths. Rare, but not a northern insect, and very likely to occur in Hants.]

9. *S. (A.) c-album*, Fieb.—With fine adpressed golden pubescence. Corium spotted with grey and ochreous, lateral margins with a large reniform yellowish spot in middle; pronotal margins straight. Almost invariably brachypterous, with abbreviated membrane, and so presents a very rotund appearance. The rare macropterous form (*S. vestita*, D. and S.) is more densely covered with golden pubescence, and somewhat resembles the following species in form and colour. Locally common, frequenting shingle by the sides of streams. I. of Wight: several localities.

8. *S. (A.) saltatoria*, L.—Clothed when fresh with fine adpressed golden pubescence. Narrower than the preceding; corium with numerous small greyish and ochreous spots, but lateral margins devoid of a conspicuous reniform yellow spot at centre; sides of pronotum rounded. Easily distinguished at sight from the ordinary form of *c-album* owing to the latter's rotund appearance. The commonest species of the family in Hants as elsewhere, inhabiting moist places generally. Common in I. of W.

13. *S. (A.) pallipes*, F.—Resembles *saltatoria* in certain of its forms, but always with the spots larger and more confluent, usually so spread over the elytra as to render them pale almost throughout; front tibiae with a black line running from the base to beyond the middle, not found in its entirety in *saltatoria*, in which species the anterior tibiae are black only at the extreme base and apex, but bear usually a brownish mark in the middle; pronotum and elytra without semi-erect pubescence. Salt marshes; more or less common all along the coast of both the mainland and I. of W. Claude Morley records it from inland at Lyndhurst.

12. *S. (A.) pilosella*, Thoms.—Colour as in the paler forms of *pallipes*, and with a well-marked dark line on the anterior tibiae; slightly longer, but narrower in proportion; upper surface throughout with semi-erect hairs. Frequents similar situations to the foregoing, with which it is often found in company. Locally common, and abounds usually in the well-known salterns at Lyminster. I. of Wight: near Ryde, and probably elsewhere.

14. *S. (A.) arenicola*, Schlitz.—Structurally hardly separable from *pallipes*, but very different in colour: deep black, with a conspicuous

white or almost white patch on lateral margin of corium just above the centre. Found near the seashore, haunting often quite dry situations—*e.g.*, the top of cliffs. Portsmouth (Moncreaff); Bournemouth (Capron and others). I. of Wight: Sandown (Champion); recorded also from the Island by Saunders. P. Harwood recently sent me for examination a short series of this insect from Highcliffe, so that it may be said to occur fairly generally along the Hants coast. Outside Hants *arenicola* has only been recorded in Br. from a single locality in Surrey, and then apparently doubtfully.

Chartoscirta, Stål.—Ocelli contiguous; pronotum narrow in front with two transverse rows of punctures, one situated just behind the anterior margin, and the other in the transverse impression; sides of pronotum sinuate. Black, shiny, with yellow and greyish markings, usually with a small but conspicuous white spot near the apical margin of the corium. In the three Br. species at least the lateral margins of the elytra are pale (yellow) almost throughout. L. 3-3½ mm.

17. *C. cincta*, H.-S.—Surface without black bristly hairs. In damp places, under rushes, etc. Common in S. Hants (with I. of W.) and probably occurs generally in the county.

[18. *C. elegantula*, Fall.—Surface with bristly black pubescence; 3rd and 4th antennal joints not thickened. (Yellow of the lateral margins spreading much more to the disc of the elytra). In var. *flori*, Dhrn., the apical joint of the antenna is yellow. At roots of plants in very marshy spots. Local. Var. *flori* in all probability inhabits Hants.]

19. *C. cocksii*, Curt. Surface with bristly black pubescence; 3rd and 4th ant. joints much thickened. (1st and 2nd ant. joints yellowish white, rest of antennae black). In *Sphagnum* almost exclusively. Common in N. Forest, etc., and has occurred in several localities in I. of W.

Fam. 12. **Cimicidae**.—Elytra with a cuneus and an embolium (see plate) but rudimentary in *Cimicina*; face produced, extending far beyond the base of the antennae. Antennae except in most *Anthocorina* with the 1st and 2nd joints thicker than the rest. Rostrum with four, and tarsi with two joints in *Microphisina* (treated as a family, O.C.) otherwise both the rostrum and tarsi are three-jointed. Chiefly small, soberly coloured insects, usually with very flat bodies. Certain of the species are parasitic, and the food of all seems to be of an animal nature. Pal. 100?

[*Larva*. Tarsi as in *Reduviidae*; last two antennal joints filiform, or head pointed and directed straight forward—body flat, elongate, oval.]

Sub-Fam. 1. **CIMICINA**.—Ocelli absent; rostrum received in repose in a groove on the underside of the head. Flat, broad-oval, ferruginous; face truncate (produced horizontally); elytra extremely short, scale-like. Parasitic on birds and mammals (including man).

Cimer, L. *C. lectularius*, L.—5-6mm. Clothed with short hairs; sides of pronotum (which is of very peculiar configuration) widely dilated and reflexed; 4th antennal joint $\frac{2}{3}$ as long as 3rd. Notorious as the "bed-bug." Less common fortunately than of yore in Hants as elsewhere.

[*C. columbarius*, Jen.—With characters of *lectularius*, but smaller;

4th ant. joint $\frac{3}{4}$ as long as 3rd. L. $4\frac{1}{2}$ -5mm. In neglected pigeon-cots and fowl-houses.]

[*C. pipistrelli*, Jen. —Clothed with long silky hairs; sides of pronotum narrowly reflexed. $4\frac{1}{2}$ -5mm. Parasitic on bats. Saunderson's detailed description (II-H. Br. Is.) was apparently drawn up from the male—in which sex the abdomen is more elongate and pointed—and seems in any case more applicable to the following species.]

C. dissimilis, Hrv. —Resembles the last, but with a much broader pronotum. I have not seen an example of this insect, and can give no character other than the above that may serve to distinguish it from *pipistrelli*.* Parasitic on bats, and has been taken in the New Forest (Gorham det. Jordan).

C. (Osciacus, Stal., id. O.C.) hirundinis, Jen. —L. 3-4mm. Clothed with rather long bristly hairs; 3rd and 4th ant. joints sub-equal, 3rd not longer than 4th as in other Br. *Cimicina*. Should be separated. Parasitic on house-martins, and often abounds in the nests of these birds in Hants.

Sub-Fam. 2. CERATOCOMBINA. (*Dipsocoridae*). —Ocelli present, and rostrum "free," in this sub-family, and in the remaining groups of *Cimicidae*. Antennae very long and thin, clothed with long hairs; 3rd and 4th antennal joints together twice as long as 1st and 2nd. Minute, delicate, active insects.

Ceratocombus, Sign. *C. coleoptratus*, Zett. —Convex, sub-elongate, pronotum sub-cylindrical; elytra rarely with membrane, etc., usually in the form of simple convex sheaths covering the abdomen. Brown. L. $1\frac{1}{2}$ mm. In moss under *Calluna*, etc., and in ants' nests. New Forest in *Sphagnum* (Morley); Bournemouth, in nest of *Formica exsecta*, Nyl. (Donisthorpe).

Cryptostemma, H.-S. (*Dipsocoris*, O.C.), *C. alienum*, H.-S. —Flat, sub-elongate, very delicate, pronotum widely transverse. Dimorphous, brachypterous form the rarer; elytra very thin, extending much beyond apex of abdomen; pale greyish-brown, more or less dull. L. 2mm. Streamsides, amidst shingle, etc. "Hants." (B.Br.H.-H.). N. Forest (Champion).

Pachycoleus, Fieb. *P. rufescens*, J. Shlb. —Very small, $\frac{1}{2}$ mm. Obovate, reddish-brown, antennae and legs flavous; pronotum sub-quadrate (narrow in proportion), transversely convex; elytra subcoriaceous, slightly shorter than abdomen; 2nd antennal joint comparatively short. Closely related to the two preceding insects, and not unlike a very small *Dipsocoris*, but easily known from both by the characters given. Streamsides, in moss. N. Forest, June, 1914 (Champion and Sharp).

Sub-Fam. 3.—ANTHOCORINA. —Antennae less thin, 3rd and 4th joints not nearly twice as long together as 1st and 2nd. Small, oblong insects, with the coloration, and in certain instances something of the appearance, of the smaller *Lygaeidae*. Most of the species, however, occur on trees and bushes, and are recognisable at once, in every case, even in the larval state, by the produced and pointed form of the face.

* Useful research would be served by any entomologist who cared to investigate the Hemipterous parasites of bats. *C. pipistrelli* has occurred in a tree-hole evidently frequented by bats.

Group I.—3rd and 4th antennal joints very fine and thin, clothed with long erect hairs.

Lyctocoris, Hahn. *L. campestris*, F.—Anterior femora hardly thicker than intermediate pair. L. $3\frac{1}{2}$ mm. Pale brown, dull, membrane smoky white. In stacks, under bark, amongst vegetable rubbish, etc. Often found in houses and out-houses, and no doubt at times a casual parasite. Very common throughout county and I. of W.

Piezostethus, Fieb.—Anterior femora incrassated, much thicker than intermediate pair. Black, elytra brown or whitish.

P. galactinus, Fieb.—L. $2\text{--}2\frac{1}{2}$ mm. Elytra always developed, yellowish-white; canal of odoriferous sac almost produced to the mesosternum. In hot-beds and manure heaps principally, but also in stacks, etc. Well distributed and usually common. I. of Wight.

P. cursitans, Fall.—Size similar. Elytra frequently abbreviated, more pubescent, testaceous or brownish; canal of odoriferous sac terminating at some distance from mesosternum. Under bark generally of dead and decaying trees, and also in the rotten wood. Common S. Hants, at least. I. of W.?

[*P. formicetorum*, Boh.—L. $1\frac{1}{2}$ mm. Not unlike a small developed *cursitans* in shape: Head wider, eyes less prominent; pronotum wider in front; elytra and legs pale ochreous. Lives in nests of the wood ant, *Formica rufa*, L., and usually obtained by sieving the pine-needles, and other vegetable rubbish, of which the ants mounds are constructed. Scotland and Kent].

Group II.—3rd and 4th ant. joints not or scarcely thinner than the preceding. Cell of wing (see plate) with a hook-like nerve; pronotum usually with a distinct apical collar. Elongate, black and brown, without dense pubescence; head long and pointed.

Temnostethus, Fieb. *T. pusillus*, H.-S.—Apex of metasternum between coxae widely truncate; rostrum reaching to intermediate coxae. L. $2\frac{1}{2}$ –3mm. Dimorphous. Black, elytra brownish black, clavus and corium inwardly paler; 2nd ant. joint usually, and legs, except femora, ochreous. Much like a small *Anthocoris*. On various deciduous trees, often running on the bark. Common both on mainland and in I. of W.

[*Elatophilus*, Reut. *E. nigricornis*, Zett.—Apex of metasternum widely truncate, but rostrum shorter, reaching only to middle of mesosternum. (Head longer, more than twice as long as its width between eyes). Elytra always complete. L. $3\frac{1}{2}$ mm. Colouring much as in the above, but antennae entirely black. elytra ochreous brown, tibiae and tarsi testaceous. On *Pinus*. Scotland.]

Anthocoris, Fall.—Apex of metasternum rounded and narrower; rostrum short, hardly reaching beyond anterior coxae. L. $3\text{--}4\frac{1}{2}$ mm. Black and brown, shiny or partially so, elytra (complete) more or less variegated with paler colour. On trees and bushes mainly; certain of the species abound individually, and may be found in winter hibernating under bark, etc. The food probably of all consists largely of *Aphididae*.

A. nemorum L. (= *sylvestris*, H.-H.Br.Is.). Elytra smooth and shiny throughout. L. 4mm. (Antennae unusually long, longer than head and thorax together; elytra whitish testaceous rather than brown, but with the cuneus dark, and corium at apex with a blackish brown spot). On various trees and shrubs; very common throughout Hants and I. of W.

[*A. limbatus*, Fieb.—Elytra entirely shiny, but species smaller than *memorum*, $3\frac{2}{3}$ – $3\frac{1}{2}$ mm. It has also the following differences: 3rd antennal joint distinctly shorter than 4th; legs entirely flavescent, the hind femora not, as is often the case in *memorum*, ringed with darker colour apically; whole of the basal part of the pronotum pale flavo-testaceous. As regards the last character the pronotum in *memorum* is sometimes dark brown or reddish posteriorly, but never, I believe, testaceous. On *Salix*. Search should be made for this insect in Hants as it has occurred in the neighbouring county of Surrey.]

A. confusus, Rent.—Clavus, corium, and inner angle of cuneus of elytra, dull. Elytra in colour dull brown, very slightly paler in some parts—e.g., at base of corium, and embolium adjoining—darker in others. L. 4mm. On oak, etc. Abounds locally in Hants. Common in I. of W.

A. nemoralis, F.—Clavus and corium dull throughout, but cuneus entirely shiny. Of very similar size and colour to the last, but usually with the paler markings on elytra more extensive and brighter, and the dark tints more intense—pitchy at base of embolium, and on cuneus. On trees and shrubs; usually common. I. of W.

A. gallarum-ulmi, DeG.—Clavus dull; corium dull except towards apex. Larger than the two last, elytra more uniformly brown (clavus and corium almost of one colour). L. $4\frac{1}{2}$ mm. On elm principally. Lymington (H.P.J.) beaten from hedgerows, and found hibernating in an old shed in garden. Local.

A. sarothamni, D. & S.—Clavus dull; corium shiny except at extreme base. Much like the preceding three species, but more glossy and distinctly darker in colour, antennae and legs in mature examples black practically throughout. L. $3\text{--}3\frac{1}{2}$ mm. On broom. "Hants" (B.Br.H.-H.). No doubt local as broom does not abound in the county.

[*A. visci*, Doug.—Resembles *confusus* in having the inner angle of the cuneus dull, but is smaller than that insect, with the head and pronotum in front red. L. $2\frac{3}{4}$ mm. On mistletoe, in company with *Lygus viscidicola*, Put., and *Psylla visci*, Curb., but always much rarer than the last two insects. It probably preys upon the *Psylla*.]

Tetraphleps, Fieb. *T. vittata*, Fieb.—Apical collar of pronotum short; sides of pronotum behind collar widely rounded, and sharply reflexed; face very long, produced even more than in *Anthrenus*. Rostrum short, extending at the most only just beyond the front coxae. Black and dark brown, dull; clavus and embolium in part paler, and membrane with four pale streaks. L. $3\frac{1}{2}$ mm. On conifers, particularly larches. N. Forest, on several occasions (H.P.J.).

Acomphocoris, Rent.—Closely allied to *Tetraphleps*, but with the rostrum longer, reaching to intermediate coxae; sides of pronotum in front scarcely reflexed. (1st antennal joint longer, just reaching apex of cheeks). Black and brown, shiny, elytra almost unicolorous.

A. pygmaeus, Fall.—Paler, elytra and legs ochreous; apical ant. joint distinctly shorter than 3rd. L. 3mm. On *Pinus*. Locally common S. Hants (including I. of W.).

A. alpinus, Rent.—Darker and narrower, membrane in ♂ longer; 3rd and 4th ant. joints subequal. L. $3\frac{1}{2}$ –4mm. On *Pinus*. "Hants"

(B.Br.H.-H.). I do not remember taking it in N. Forest, neither have I received specimens from there. It is however almost certain to occur.

Triphleps, Fieb.—Pronotum without a distinct collar, and head short. Species in the main much smaller than those of the *Anthocoris* group, and distinctly broader in proportion. Black, shiny, elytra and legs usually more or less pale (ochreous).

T. nigra, Wlff.—Hind and intermediate legs black or piceous; antennae in ♂ much thickened, and rather flat. Elytra largely ochreous ♂, piceous or almost black ♀. L. $1\frac{1}{2}$ -2mm. Common in N. Forest, etc. I. of Wight: various localities. On heath (both *Erica* and *Calluna*), gorse, etc.

T. majuscula, Reut.—Larger, and paler than *nigra*, legs entirely pale ochreous (hind femur sometimes darker). Antennae slender. L. 3mm. With difficulty distinguished from the next species as under: Larger. Pronotum towards apex much narrower, sides rather slightly rounded anteriorly, narrowly reflexed in ♂ nearly or quite down to the posterior angles; disc of pronotum with a broad callus, which is greatly drawn out towards the sides, making the greatest breadth of the pronotum at this point; disc of pronotum behind callus transversely wrinkled only in the middle, and less densely punctured towards the more glossy sides. Elytra pale ochreous, with cuneus, and clavus at least at base, piceous. Fairly common, by sweeping in damp places. I. of W.?

T. minuta, L.—L. 2-2½mm. Greatly resembles *majuscula*: Legs pale; pronotum with the sides towards the apex more rounded and extended (♀) or almost straight, and only rounded at the angles (♂); lateral margins of pronotum in ♂ less distinctly reflexed* than in that sex in *majuscula*, especially posteriorly. Disc of pronotum with median callus narrow occupying only about $\frac{2}{3}$ of the breadth of the pronotum at this part; disc behind callus strongly and densely wrinkled and punctured throughout. Elytra pale ochreous; *unicolorous*, except for a faint cloud at base of clavus, and (rarely) some slight darkening of the cuneus. By sweeping herbage; said (J. Edwards) to frequent gorse when this is in full flower. Set Thorns, and occasionally elsewhere in N. Forest (H.P.J.) I of Wight: several localities both on coast and inland (E. A. Butler.).

Group III.—In the remaining four genera in *Anthocorina* the antennae are of the form met with in Group II, but the wing cell lacks a hook-like nerve. Species more or less thickly pubescent, or with the body black, elongate, almost parallel-sided.

Brachysteles, M. & R. *B. parvicornis*, Cost.—Broad, oval, dark brown, rather thickly covered with pale pubescence; head short, scarcely longer than its width between eyes. L. $1\frac{1}{2}$ mm. Very local in Br. Totland Bay, I. of W., Aug. '02., running on mud where rushes are growing scantily (E. A. Butler.).

[*Cardiastethus*, Fieb. *C. fascii-reutris*, Garb.—Narrow, oval, clear yellow, clothed with very fine pale hairs; head much longer than its width between eyes; pronotum much narrower in front. L. 2mm.

*Reuter says "extended"; the reflexion, of course, is very minute. (H.P.J.)

Rare; has been taken by "sweeping" low-plants, and also by beating hawthorn and fir-trees.]

[*Xylocoris*, Duf. *X. ater*, Duf.—Elongate, glabrous, parallel-sided; black, shiny, elytra often more or less piceous, membrane whitish at base; tibiae testaceous. L. 2mm. Subcortical, occurring usually under bark of coniferous trees.]

[*Xylocoridea*, Reut. *X. brevipennis*, Reut.—Resembles the last in general form and colour, but scarcely parallel-sided, abdomen a good deal wider than elytra, sub-oval; elytra abbreviated, about as long as pronotum; 4th antennal joint longer, much longer than 3rd; eyes more remote from pronotum. L. 2.5mm. Occurs under hawthorn-bark; local.]

Sub-Fam. 4. MICROPHYSINA.—Rostrum with four, tarsi with two joints. Sexes very dissimilar: ♂♂ fully winged, and much like *Anthracorina* in shape; ♀♀ with merely rudimentary hemielytra, no wings, and with the abdomen remarkably broad and convex (globose). ♂♂ usually in comparison rare.

Microphysa, West.—2nd ant. joint distinctly longer than 4th; rostrum reaching beyond anterior coxae.

M. pselaphiformis, Curt.—Head and thorax dull; ♂ subelongate; ♀ with elytra covering half of the abdomen. Brown or brownish, head and pronotum in ♂, and abdomen posteriorly in ♀, almost black; head in ♀ red at base, ♂ with embolium and cuneus somewhat red. L. ♂ 2mm. ♀ 1½mm. Both sexes have been found on old thorn-hedges. Butler has taken ♀♀ on trunks of limes, and they occur also in faggots, on palings, etc. Hallet has observed this insect in all its stages emerging from burrows of the beetle *Scolytus rugulosus*, Ratz., in stems of *Prunus*. New Forest (Butler); Brockenhurst, ♀♀ not uncommon on lichen-covered blackthorns (H.P.J.).

M. elegantula, Baer.—Much less wide, and more delicate than *pselaphiformis*. Head and thorax shiny; ♂ elongate, elytra parallel-sided; ♀ with elytra extremely short and narrow, leaving the swollen abdomen wholly exposed. Colour: ♂ head and pronotum brown; elytra light fawn-brown, clavus, base of corium, and embolium at apex, paler, cuneus red. ♀ with head, thorax, minute elytra, and legs, clear yellowish red (*very rarely* fuscous) abdomen black. L. ♂ 2¼mm. ♀ 1½mm. With very similar habits to the preceding. ♂♂ very scarce, but ♀♀ often common on tree-trunks in crevices of bark. (Generally distributed and rather common in S. Hants, at least (including I. of W.)

Myrmedobia, Baer.—2nd ant. joint not longer than 4th; rostrum not reaching beyond anterior coxae. Head and pronotum usually distinctly wider than in *Microphysa*. ♀♀ brown or brownish, legs paler, head and pronotum more or less red; ♂♂ black or brownish-black. L. ♂♂ 1½-2 mm. ♀♀ 1-1½ mm.

M. tenella, Zett.—♂ sides of pronotum in front produced so as to enclose apical collar, which is very narrow and indistinct; anterior angles of pronotum dilated and reflexed. ♀ elytra abbreviated; pronotal transverse impression deep; lateral margins of pronotum reflexed. ♂

principally by sweeping in grassy spots; ♀ in moss, lichen, and on coniferous trees. "Hants" (B.Br.H-H).

M. distinguenda, Reut.—Pronotum in ♂ very similarly formed, but with the anterior angles simple—*i.e.*, not dilated; pronotum without an impression at base, and transverse discal impression less deep; insect more pubescent. ♀ resembles *tenella*, but lateral margins of pronotum not reflexed; antennae longer, 2nd and 4th joints sub-equal. ♂ by sweeping in grassy places; ♀ by beating thatch, old hedges, and by general sweeping. N. Forest, ♀ ♀ (H.P.J.) "Hants" (B.Br.H.-H.).

[*M. coleoptrata*, Fall.—♂ sides of pronotum not dilated or produced anteriorly, but gradually rounded to apical collar, which is short but distinct; head in length from ocelli to apex about equal to interval between eyes; elytra finely pilose; legs brown. ♀ elytra covering abdomen; pronotum without transverse impression. L. ♂ 2mm. ♀ 1½ mm. Associated apparently with ants of diverse species. ♂ from nest of *Acanthomyops alienus*, Frst. It is curious that this insect is not recorded from Hants where no less than 31 species of ants occur*.]

M. inconspicua, D. & S.—The smallest Br. species of the genus. L. ♂ 1½mm. ♀ scarcely 1mm. ♂ resembles *coleoptrata* (♂) in shape of pronotum, but darker than that insect, with head much longer than interval between eyes; antennae proportionately longer and thicker; elytra glabrous; legs black. ♀ pronotum without distinct transverse impression, but elytra abbreviated. Sand-hills chiefly, according to Butler: ♀ ♀ in moss. Sandown, I. of W. (Champion); "Hants" (B.Br.H.-H.).

Fam. 13. **Capsidae** (*Miridae*).—Elytra with a cuneus, but without an embolium, and made up therefore of four parts, as compared with five in *Cimicidae*, or three in other families. Species more or less elongate, or elongate oval, with the integument generally of a softer nature than in most Heteroptera. Antennae four-jointed, usually at least as long as the body; 2nd joint the longest; in a few species the long 2nd joint is enormously swollen, or otherwise strangely modified; generally however the antennae are slender, with the first joint often the most prominent. Ocelli rarely distinguishable; antenniferous tubercles very slight. Colours varied, and often vivid; many of the species are *green*, but red, brown, and yellow tints perhaps predominate, usually in combination. Capsid bugs appear to subsist largely on vegetable juices, and a species as a rule will be found to have a particular attachment to a certain plant, or group of plants. Low vegetation is the most favoured. Few of the species seem to pass the winter in the adult stage, and therefore examples have mainly to be sought for in this condition from July to early autumn. Of well over 1000 Pal. species 178 inhabit Br. all of which last are here described.

[*Larva*.—Integument more or less soft and delicate throughout, and impunctate; colours on the whole bright, but never metallic or lustrous; antennae generally long, and more or less slender; basal tarsal joint short above, much longer beneath.]

*See my list of "Aculeate-Hymenoptera of Hants," *Trans. Ent. Soc. of Hants and I. of W.*, 1925-6.

Sub-Fam. 1. *MIRINA*.—Arolia (pads appended to claws) large, free, approximating at base between claws, plainly separated towards apex, and at apex generally somewhat dilated (Reuter). Chiefly 6-12mm.

Tribe (a) *MIRARIA*.—Prothorax without apical ring; vertex with longitudinal sulcation, or transversely impressed. Elongate, or elongate-ovate, green or ochreous, often fuscous or black in part, or striped longitudinally with darker colour; antennae (generally very long) with the first joint robust and hairy; legs long, not unduly thin. Amongst grass or rushes, the seeds or spikelets of which the insects in life much resemble. The species of *Stenodema*, at least, hibernate as perfect insects. Pal. 300.

Div. I. Head channelled down the middle.

Stenodema, Lap. (*Miris*, Br. Cat.).—Base of pronotum truncate covering base of punctured scutellum. Green or ochreous, pronotum at least with darker lateral markings. Examples found in spring and early summer are green, whilst those occurring in the autumn are ochreous, streaked often with brown or dull red. As the spring specimens appear to consist of overwintered females, it seems obvious that these are enabled to make the change from ochreous to green at some period of their hibernation.

S. (subg. *Brachytropis*) *calcaratum*, Fall.—Posterior femora strongly toothed. L. 7mm. By sweeping long grass. Well distributed, and usually very common.

S. laevigatum, L.—Hind femora simple; insect elongate, basal antennal joint densely clothed with long hairs. L. 8mm. By sweeping amongst grass, etc. Common and well spread.

S. holsatum, F.—Hind femora simple; insect elongate-ovate, 1st ant. joint with very short hairs. L. 5-6mm. Perhaps more extensively marked with darker colour than its allies, but with lateral margins widely pale. Long grasses in or under woods. Generally very common in S. Hants, including I. of W.

Megaloceraea, Fieb.—Base of pronotum emarginate, not covering base of practically impunctate scutellum. Green in life, head and thorax, at least, more or less striped with darker colour.

M. (*Notostira*, Fieb. O.C.) *erratica*, L.—Tibiae densely pilose, but without fine spines. L. 8-9mm. (1st ant. joint less long than in the next species). Abundant amongst grasses almost everywhere. ♂ usually more or less dark fuscous or black, except laterally, but with a pale line down the middle of the pronotum.

M. linearis, Fuessl.—Tibiae not densely pilose, but with very fine short spines. Antennae longer than body, 1st joint nearly twice as long as head. L. 9-10 mm. On grasses, etc. Fairly common, N. Forest.

M. (*Trigonotylus*, Fieb., O.C.) *ruficornis*, Geoffr.—Tibiae as in *linearis*, but antennae not longer than body, basal joint scarcely longer than head. L. 6-8 mm. Usually very much smaller, of a more intense green, and altogether more delicate looking than the two

* Extremely minute, and unfortunately impossible to appreciate in specimens that have the legs gummed to cards. (H.P.J.).

preceding insects; antennae bright red or pink. Amongst grass; generally distributed, but never very abundant.

M. (T.) psammaecolor, Rent.—Of similar size and shape to *ruficornis*, but much paler throughout, head longer, especially that part that lies between the antennae: basal ant. joint stouter, with longer hairs; 3rd ant. joint shorter; legs more hairy. On marram grass (*Ammophila*) chiefly. "Hants" (H. R. P. Collett). Coast at Christchurch (H.P.J.)

Div. II. Head not channelled, but transversely impressed.

Acetropis, Fieb. *A. gimmerthali*, Flor.—Eyes not or scarcely projecting beyond lateral margins of pronotum. Pale ochreous, with darker longitudinal stripes. Rather short, sides rounded in outline. L. 6mm. By sweeping amongst grass or rushes. N. Forest (Marshall). Not uncommon locally in S. Hants, but unrecorded from I. of W.

Teratocoris, Fieb.—Eyes prominent, projecting considerably beyond lateral margins of pronotum; depressed, glabrous above or nearly so. Pale green, or ochreous; head and thorax mainly black, or with a black central stripe. (Colouring within a limited range very variable, and untrustworthy as a character.) L. $3\frac{1}{2}$ – $6\frac{3}{4}$ mm. Elongate, ♂♂ the smaller.

T. antennatus, Boh.—1st ant. joint red, smooth, and nearly glabrous, its pubescence very fine, and barely perceptible. L. ♂ $3\frac{1}{2}$ –4 mm. ♀ 4 – $6\frac{3}{4}$ mm. (Head and thorax as a rule more or less black, elytra fuscous or black in part; immaculate examples—either green or ochreous—however are not infrequent.) In damp places, usually near the sea, at roots of *Scirpi*, rushes, etc., or on leaves of last. Lymington salterns (E. A. Butler and others); Milford and Boldre (H.P.J.)

[*T. viridis*, D. & S.—1st ant. joint not red, with distinct projecting hairs; in ♂ shorter than 4th joint, in ♀ $1\frac{1}{2}$ times as long as head. Pronotum and scutellum in ♂ black with pale markings. L. 4–5mm. I have not seen a living example of this insect, which in the Br. Isles appears to be confined to Scotland and Ireland.]

T. saundersi, D. & S.—1st ant. joint not red, and with projecting hairs; in ♂ as long or longer than 4th, in ♀ $1\frac{2}{3}$ as long as head. ♂ pronotum and scutellum green, except for a black central stripe. L. ♂ 4 – $5\frac{3}{4}$ mm. ♀ $4\frac{1}{2}$ – $6\frac{3}{4}$ mm. (The sexes in *T. saundersi* seem always entirely green but for the black thoracic stripe—indistinct usually in ♀.) Lymington and Christchurch (G. C. Champion); Milford, marshland near (H.P.J.). By searching at the roots of rushes, etc.

Miris, Fall. (*Leptopterna*, Br. Cat.).—Eyes prominent, as in *Teratocoris*, but insect clothed with erect hairs, and not depressed, or green in colour. Larger species, 8–9mm.

M. ferrugatus, Fall.—Colour black, brown, or reddish, tibiae with shorter semi-erect hairs. (1st ant. joint not conspicuously thicker than 2nd.) In grassy places; generally distributed, and often very common, in S. Hants and I. of W.

M. dolabratus, L.—Black and yellow, tibiae with long erect hairs. Abounds in dry grassy and flowery places throughout county and I. of W.

Tribe (b) RESTHENIARIA (= *Loparia*).—Prothorax with apical ring, pronotum margined anteriorly; black or brownish black, with red,

orange, or yellow markings; not shiny. Oblong, elytra nearly parallel-sided; cuneus yellow or orange except in certain varieties. L. 6-7½mm. So far as the Pal. region is concerned this group is composed only of the single genus *Lopus* of 12 species.

Lopus, Hhn. *L. gothicus*, L.—Legs without pale rings; sides of pronotum straight, its disc black. Clothed with rather long erect black hairs. Variable in the spread and intensity of the pale markings.

Var. *superciliatus*, D. & S., is almost entirely black. By searching at the roots of coarse herbage, and occasionally by sweeping. It also frequents flowers—e.g., *Rubus*—and Morley has taken var. *superciliatus* (in Suffolk?) from white poplar. N. Forest (Power); Bournemouth (Dale).

L. sulcatus, Fieb.—Legs without pale rings; sides of pronotum sinuate, its disc with a central pale line. With much shorter and finer black hairs. According to Butler (B.Br.H.-H.) is usually found by sweeping in rather damp flowery places in forest land, especially where wild roses are growing. It has occurred to me under practically identical conditions at Boldre in the N. Forest. Near Fareham; abundant (H. Francis); Hayling Is., on flowers of *Rubus* (Saunders). I. of Wight: several localities.

L. flavomarginatus, Don.—Hind and intermediate femora at least, and all tibiae, each with a pale ring. With very fine pale decumbent pubescence; pronotum much narrower in front. Near Fareham, with *sulcatus*, but very scarce in comparison (H. Francis). On flowers, e.g., *Rubus*, *Senecio*, *Umbelliferae*—where it occurs.

Tribe (c) CAPSARIA.—Pronotum with an apical ring, but not margined anteriorly, or if so, colours not as in *Irestheniaria*. Oblong or oval, not as a rule very elongate; variously and often highly coloured, with the paler markings frequently the more pronounced on the cuneus and scutellum. Antennae of somewhat variable form, but usually, with the legs, long and slender. Certain of the species are extremely fragile, and a considerable percentage of the group occur on trees; few inhabit grass. Pal. 300?

Div. I. Cuneus distinct, often very brightly coloured; elytra never abbreviated. Form and colour variable. Many of the species are amongst the finest of our native *Capsidae*.

[NOTE: without disturbing the order of the genera I am unable to devise any practical means of sub-division of this important section. Unless therefore the reverse is obviously indicated the various generic characters given must be considered as peculiar in every instance.]

Pantilius, Curt. *P. tunicatus*, F.—Antennae with 3rd and 4th joints together much shorter than 2nd joint; 1st and 2nd joints robust. Head channelled on vertex. Rather flat, broad, almost parallel-sided; red, or green largely tinged with red, freckled minutely with black. L. 8-10mm. This fine distinct species occurs more or less throughout Hants on leaves of trees, particularly hazel.

Miridius, Fieb. *M. quadrivirgatus*, Cost.—Elongate ovate; pale yellow, with longitudinal rust-coloured stripes (confluent on corium). L. 11-12mm. A very handsome insect found amongst long grasses, "chiefly in open places not too far from the sea." I. of Wight: Sandown (Donisthorpe) and other localities.

Phytocoris, Fall.—Membrane marbled, and tinted more or less in agreement with the rest of the elytra. Rostrum very long, produced beyond posterior coxae. Oblong, of graceful shape, and very fragile; grey, green, or brown, mottled with darker colour (variable in the amount of the mottling). Hind legs very long, the tibiae extremely slender, the femora thickened. Antennae very long and slender, 1st joint with bristly hairs. Body with soft fine pubescence. L. 6-7½mm. Certain of the "brown" species are extremely closely allied, and although possessed usually of a distinct facies, present little or no very reliable colour or structural differences. On trunks and branches of trees and bushes mainly, where they hide in crevices of bark.

Group I. Intermediate tibiae with transverse bands. Species not reddish-brown in colour.

P. populi, L.—Basal antennal joint with three longitudinal dark bars, whereas in all the following species the joint is merely spotted irregularly, or marbled. Grey or ochreous, mottled extensively with dark brown or black, sometimes entirely black. On trunks of trees, often fruit trees in gardens; not especially addicted to poplars. Common locally in S. Hants, although not I think recorded from the I. of Wight.

P. tibiae, F.—Peculiar in its colour: green or greenish-yellow, more or less freckled or marbled with black. Apical black bands at least of intermediate tibiae frequently narrower than the intervening pale bands; sides of pronotum nearly always widely black; elytra not very long; posterior femora normal. On various trees and bushes; very common. Abounds in N. Forest. Somewhat local in I. of Wight?

P. longipennis, Flor.—Dark bands of intermediate tibiae distinctly the narrower throughout. Sides of pronotum not widely black; elytra very long; hind femora very long and slender. Greyish-ochreous, somewhat faintly and sparingly mottled with darker colour. On trees and bushes, particularly hazel and oak. Well distributed in S. Hants and I. of W.

P. dimidiatus, Kirb.—In common with the two species that follow almost invariably has the dark bands of intermediate tibiae wider than the pale bands. Much like certain forms of *populi* in colour, but basal ant. joint not marked as in that insect. More mottled, and less brown, than *reuteri* following; 3rd ant. joint proportionately shorter, 1st joint longer, distinctly longer than 4th. Chiefly on oak. N. Forest (H.P.J.); "Hants" (B.Br.H.-H.).

P. reuteri, Saund.—Pale brown, mottled with darker colour; 1st and 2nd ant. joints subequal, 1st joint nearly as long as head and pronotum together. Shorter than most of the preceding species, rarely more than 6mm. N. Forest; fairly common (H.P.J.). I. of Wight: Ryde, on apple tree (Morley). Inhabits various trees, and found also amongst low plants.

[*P. pini*, Kbm.—Smaller and stouter looking than the other Br. species, but at least approaches *reuteri* in size. Ochreous brown, perhaps with a slight reddish tinge, mottled with darker brown; basal ant. joint hardly longer than pronotum, about equal to or shorter than apical joint. On *Pinus*, and other conifers. A northern insect in Br.]

Group II. Intermediate tibiae without transverse bands; insect reddish-brown in colour.

P. varipes, Boh.—Basal ant. joint slightly thickened, with only very fine and short bristles. Distinct in its markings from all the other species; paler normally than *ulmi*, elytra unmottled, with darker longitudinal stripes; head and scutellum with a pale central line, and pronotum anteriorly with three pale (yellowish) stripes; cuneus almost unicolorous, not dark red. Usually found about low plants, amongst which may be mentioned grasses and rushes; a rather small and dark form occurs on heaths under *Calluna*. Common in S. Hants and I. of W.

P. ulmi, L.—1st ant. joint not thickened, with long bristly hairs. Darker than *varipes*, without stripe-like markings, and elytra mottled with silvery pubescence; cuneus pale at base, otherwise dark red. Common in S. Hants, at least, and I. of W. On elm, hawthorn, hazel, and other trees, but also amongst low plants—especially nettles.

Megacoelum, Fieb. (*Calocoris*, Br. Cat.).—Head distinctly channelled on vertex between eyes, as in *Pantilius*, but antennae with 3rd and 4th joints together about equal to 2nd. Oblong, elytra almost parallel-sided. Antennae inserted near the middle of the eyes. L. 8 mm.

M. infusum, H-S.—Shiny, body glabrous; orange-yellow, legs darker (reddish); scutellum, base of pronotum, and corium at apex usually more or less black; cuneus generally bright red, the colour extending laterally to the apical portion of the corium. Both black and red markings on occasion are entirely absent. L. 8mm. Chiefly perhaps on oak. N. Forest (H.P.J); I. of Wight: Marvel Copse (Butler).

[*M. beckeri*, Fieb.—Very closely allied to *infusum*, but clothed above with long erect hairs, “easily rubbed off.” Somewhat larger, more robust, antennae a little stouter; setae and fine hairs of hind tibiae longer, and hind margin of posterior femur near apex also with long hairs. Weybridge and Oxshott, Surrey, only in this country; examples taken from *Pinus* just above nests of *Formica rufa* (Donisthorpe). Apparently associated in some way with ants. See also “Guests of Br. Ants”; Donisthorpe.]

Adelphocoris, Reut. (*Calocoris*, Br. Cat.).—Head very indistinctly channelled. Antennae inserted near the apex of the eyes. In shape much like *Megacoelum*, with fine pale pubescence. Rostrum reaching beyond intermediate coxae; insect with 3rd and 4th ant. joints as thick as 2nd joint. Of large or moderate size, not less than 7mm.

A. lineolatus, Gze.—Greyish-green, cuneus paler; corium often suffused or streaked apically with brownish, pronotum in many specimens with two black spots, and scutellum with two dark discal streaks—sometimes abbreviated, but rarely absent. L. $8\frac{1}{2}$ -9mm. On *Ononis*. Fairly common in S. Hants, and I. of Wight.

A. ticinensis, Mey.—Pale brick-red, sometimes in places with a slight greenish tinge; often with two black spots on pronotum, and with the corium dark apically. About 7mm. By sweeping long grasses, etc., in very damp and marshy situations. Matley Bog, N. Forest, several on skullcap, July, '01 (C. Morley). “Hants” (B.Br.H.-H.) I. of Wight: Rookley Wilderness (Butler.)

A. seticornis, F.—Black-brown, paler in part—*e.g.*, laterally; cuneus black at apex, otherwise red. With fine pale golden pubescence. L. 8-8 $\frac{1}{2}$ mm. I. of Wight: Luccombe (Power); Sandown, “swept

amongst long grass intermingled with a small vetch, probably *Ornithopus*" (Butler); Luccombe (Power); Freshwater (F. S. Saunders.)

Calocoris, Fieb.—Head not channelled on vertex, or if furrowed insect exceptionally large, 10mm. or more, and entirely green. 3rd and 4th ant. joints thinner than 2nd; rostrum reaching beyond intermediate coxae. Oblong or oblong-oval, pubescent. L. 7-10½mm.

C. norvegicus, Gml. (*C. bipunctatus*, Br. Cat.).—L. 7mm. Green, 4th ant. joint shorter than 3rd. Clothed with rather coarse black pubescence, long on head, the surface of which, as seen through the hairs, appears somewhat dull, and carries between the eyes a shallow central impression. Pronotum generally with two black spots, but scutellum unicolorous; ♂ elytra sometimes more or less reddish-brown between the nerves; femora of legs freckled with brown. On various low plants, especially nettles. Abounds in S. Hants and I. of W.

[*C. alpestris*, Mey.—Larger, 10-10½mm. Entirely green (the colour very clear and bright in life) apical ant. joint as long or longer than 3rd. With rather short and fine black hairs; elytra in ♂ very long, and parallel-sided. The head in a number of my specimens bears a delicate but distinct longitudinal sulcation on the vertex. As remarked by Butler (B.Br.H.-H.) this is a fine insect when fresh, but shrivels and discolours badly after death. Confined in Br. mainly to the northern and north-midland counties. In Notts, where it appears to be common and well spread, I have usually taken this species by sweeping amongst low vegetation growing in drives, etc., in woods: See also "Invertebrate Fauna of Notts," J. W. Carr].

C. roseomaculatus, De G.—Greenish-ochreous, tinged with browner colour on pronotum and head (the last however marked also with black in ♂); clavus except towards apex mainly red or reddish-brown, and corium apically with two red stripes—often more or less confluent. With short blackish hairs. L. 8mm. Very distinct by reason of the apical pair of red stripes on each elytron. By sweeping in dry flowery places. Near Winchester (H.P.J.) "Hants" (B.Br.H.-H.) I. of W: Common on the chalk (Butler); Sandown (J. M. Brown).

C. fulvomaculatus, De G.—Narrower than the last. L. 7mm. Olive-brown (darker or paler), dull, with rather remote bright golden hairs; cuneus outwardly yellowish (♂), or reddish-yellow (♀). Head black down middle, and pronotum usually with two black spots. On various trees and shrubs, also on flowers of *Umbelliferae*, etc. Said to be destructive to hops. Occurs more or less commonly throughout Hants (including I. of Wight).

[*C. sexguttatus*, F. var. *insularis*, Reut.—Of similar size and shape to *fulvomaculatus*, but more nearly parallel-sided. With the exception of the legs, black, shiny, with pale yellow and orange markings, distributed as follows: Pronotum with the collar, a wide line down the middle, and the lateral margins towards the base, clear pale yellow; scutellum, clavus at apex, a spot on the inner margin of the corium, much of the basal half of last, and its lateral margin throughout, yellow or whitey yellow. The extreme base of the antennae and two spots on the head by the eyes are usually very pale yellow. Cuneus, except narrowly at apex, bright orange, the colour spreading slightly to the lateral margin of the corium. Legs brownish, femora darker at base. In weedy places, amongst nettles etc., under-woods; also on

flowers, especially *Umbelliferae*. Abundant in many parts of the north and north-midlands—e.g., Notts., where it may be accounted one of the commonest Capsids—and recorded locally also from Herts, Devon, Dorset, etc].

C. ochromelas, Gml.—Oblong-oval. L. 8mm. Pale yellow tinged often with orange, legs darker: shiny, head and pronotum marked with black, the latter usually with four dark spots on disc, and with the base, except narrowly at middle, black; elytra with delicate longitudinal brown or black stripes. In the northern var. *fornicatus*, Fieb., the ground colour is considerably darker, and the very characteristic dark spots and stripes are much reduced. Examples from the north-midlands often exhibit a strong tendency to melanism. On oak. Common in woody areas in S. Hants and I. of W.

[*Homodemus*, Fieb. (*Calocoris*, Br. Cat.) *H. M-flavum*, Gze.—Rostrum not reaching beyond intermediate coxae; basal joint of antenna shorter than head (2nd joint nearly four times as long as 1st). Body black, with yellow markings: head with a pale line near each eye, pronotum with the collar, and three longitudinal basal lines or spots, yellow; scutellum black; clavus and corium outwardly at least yellow; cuneus yellow or orange; legs dark brown. L. 8mm. On low plants. Extremely rare in Br., and a doubtful native].

Pycnopterna, Fieb. *P. striata*, L.—Rostrum as in last species, appearing very short in comparison with the body; basal ant. joint not shorter than head. Large, sub-elongate, 10mm. or more. Head and pronotum deep black, a line near each eye on the head, and a large spot in the middle of the pronotum, yellow (frequently the yellow pronotal spot is extended to a wide band across the thorax, or more rarely may scarcely exist); scutellum usually with the sides yellow, otherwise black; corium brownish, delicately streaked lengthwise with yellow or orange—the colour mainly confined to the nerves; cuneus bright orange, often much clouded with brown; legs normally orange-red, darker at apex of femora. This exceptionally large and striking species is common in woods, etc., on the mainland of Hants, but appears to be unrecorded for the I. of Wight. It frequents hawthorn, oak and other trees.

Stenotus, Jak. *S. binotatus*, F.—Rostrum long, reaching beyond hind coxae, a character not found in any other of the *Calocoris* group. L. 6-7mm. Sub-elongate, ♂ dull yellow, ♀ pale dull green, marked in either instance (extensively in ♂) with black on the body. Elytra finely pubescent. The ♂ is so marked as to be not unlike a small and faded-looking *C. sexguttatus*; ♀ with the dark markings usually reduced to two (prominent) black spots on the pronotum, and a wide blackish stripe down each elytron or with the elytra entirely pale. According to Reuter the orifices of the metastethium are prolonged externally into a rather long transverse furrow, which is not the case in *Calocoris*, with which the insect is most likely to be confounded. Common amongst long grass by road-sides, etc., wherever I have collected in Hants and I. of W.

Dichroscytus, Fieb. *D. rufipennis*, Fall.—Smaller than any of the above, except certain examples of *Stenotus*. Green, with red markings; head with a slight transverse carina on vertex near each eye; insect impunctate.

D. rufipennis, Fall.—Shiny, green, subglabrous; oblong, parallel-sided, clavus and corium of elytra deep red except narrowly at margins; membrane with red nervures. L. 6mm. On *Pinus sylvestris* chiefly in this country. Of local occurrence in both S. Hants and I. of W.

[*D. valesianus*, Fieb.—Not unlike *rufipennis* in form and colour, but much smaller, barely 4mm. Five examples were taken from juniper bushes at Goodwood, Sussex, July 1919, by P. Harwood.]

Plesiocoris, Fieb. *P. rugicollis*, Fall.—Less than 7mm. Impunctate, or almost so, but with the pronotum rugose or transversely wrinkled, and scarcely convex. Vertex of head carinated near eyes. Bright green, with the head, pronotum anteriorly, legs, and sides of elytra yellow. On sallow chiefly in the open, but has occurred in gardens, etc., on apples, blackcurrants, and other trees and bushes. Throughout Hants, and recorded from the I. of Wight.

Lygus, Hbn.—Punctured, pubescent, not exceeding 7mm. Head transversely carinated at vertex (frequently also with a faint longitudinal central impression); pronotum convex, closely punctured, without definite wrinkles. Pubescence distinct, not golden or deciduous. Head very little broader than apex of pronotum. Colouring usually some shade of green or testaceous, with darker and paler spots or suffusions—the amount of the markings varying greatly in individuals.

Group I.—Green, legs green, antennae very long and slender. Insect rarely less than 5mm.

L. (subg. *Lygocoris*) *pabulinus*, L.—Vertex of head carinated only near the eyes; spines of the tibiae so fine as to be scarcely noticeable. Elongate-oval, about 6mm. On nettles, etc. Common in S. Hants and I. of W.

L. contaminatus, Fall.—Vertex of head posteriorly carinated throughout, as is also the case in all the following species. Tibial spines fine, brown, arising from brown or black spots; clavus entirely green, or very faintly tinged with brown basally; eyes very prominent, crown of head between in ♂ much narrower than each eye, in ♀ about as wide as the eye. Elongate-oval, 6-7½mm. On birch, almost exclusively. S. Hants, fairly common. I. of Wight: Combley Wood (Butler).

L. viridis, Fall.—Much resembles the last species, with the spines of the tibiae similar; clavus normally brown, or partly brown; eyes smaller, further apart, vertex of head between in ♂ about as wide as each eye, in ♀ much wider. On oak, as a rule, but alder, lime, and even buckthorn (*Rhamnus frangula*) are mentioned as food plants. In a form taken abundantly by Butler in Wales from alder, the clavus is very little darker than in *L. contaminatus*. New Forest, from oak: not uncommon. I. of Wight; Combley Wood (Butler).

L. lucorum, Mey.—Broader, more convex, and of a slightly deeper green than the three preceding species: tibial spines black and strong, not produced from dark spots. Cuneus entirely green. On various low plants, and occasionally trees. Lymington and elsewhere in S. Hants (H.P.J.). Marvel Copse, I. of W. (Butler).

L. spinolae, Mey.—Resembles the last in form and size, and with similarly black and strong tibial spines; of a paler green, with the cuneus brown or black at extreme apex. On thistles, nettles, and other low plants. S. Hants, and I. of Wight; usually common.

Group II.—Not green, or if green, with the antennae not very long, or with the legs orange red. L. $3\frac{1}{2}$ -7mm.

The subg. *Orthops*, Fieb., is composed of species of small size (scarcely 4mm.) with short antennae reaching to about the apex of the clavus.

[*L. limbatus*, Fall.—Oval, yellowish-green, with more or less distinct black or brown markings; femora of legs orange-red. L. 5mm. On *Salix* where it occurs; either extremely local or overlooked in this country].

L. pratensis, L.—Colour green in some examples, testaceous in others, usually considerably suffused or spotted with dull black or brown: scutellum frequently with two dark discal streaks, and with the pronotum anteriorly spotted with black. Antennae reaching to about the apex of the clavus. Oval, robust, rather short; large compared with any of the following species. L. $5\text{--}7\frac{1}{4}$ mm. No less than six vars. or races of this excessively variable species have been described, all of which, although possessing a strong general facies, betray constant minor differences in colour, size, and in the depth and amount of the puncturation. At least two of these forms occur commonly in Br. vic., var. *punctatus*, Zett., and var. *campestris*, Fall., and have been taken in the N. Forest, and other parts of S. Hants. Amongst nettles and grasses, and on flowers of tansy, *Senecio*, gorse, etc. Var. *punctatus* may be found regularly on ragwort, although perhaps hardly confined to the plant. *L. pratensis* has occurred oddly in almost every month of the year, and undoubtedly hibernates at times.

L. rubricatus, Fall.—Smaller, narrower, about 5mm. Entirely pale orange-red. Reuter defines five stable vars., and even in this country the colour varies considerably in its intensity. On *Pinus sylvestris* chiefly. New Forest (Champion).

[*L. atomarius*, Mey.—Testaceous, rather dull, with a reddish tinge, sometimes more or less irrorated with black, or with a black stripe on each elytron; peculiar in having the membrane irrorated with grey. Elongate-oval. L. 4-5mm. Inhabits coniferous trees. In the Br. Isles has occurred only in Norfolk and Ireland.]

L. cervinus, Mey.—Elongate-oval, about 4mm. Brownish-testaceous, almost unicolorous, or with dull reddish-brown markings, arranged somewhat after the fashion of the dark markings borne by the next species. Structurally it varies little from *viscicola*, but apart from the question of habitat, is rendered distinct from that insect by its comparatively slender form, and pale brownish colour. From the remaining three species it may be easily known by the style of the markings, and longer slenderer antennae, the 2nd joint of which is more than twice as long as the 3rd. On lime, ash, and other trees. I have taken it in the N. Forest, and at Lymington, and it is locally common in the I. of W.

[*L. viscicola*, Put.—Short-oval, robust; greenish-ochreous, elytra with a broad semi-circular red-brown band, the respective ends of which often unite laterally with a dark cloud at the base of the corium of each elytron; pronotum posteriorly tinged with brown, clavus red-brown basally, and scutellum brownish, with two dark, almost black, discal stripes. Apex, and inner margin usually, of cuneus red; hind femora reddish. L. 4mm. On Mistletoe, and necessarily local. Up

to the time of writing appears only to have been noticed in England and France.]

L. (subg. *Orthops*) *pastinacae* (= *campestris*, Reut.) L. $3\frac{1}{2}$ -4mm. Antennae rather stout, distinctly short, reaching only to about the apex of the clavus, 2nd joint not quite twice as long as 3rd. Green, or greenish-ochreous, more or less clearly marked with brown or black, but not in the manner met with in the two preceding species: generally with the clavus *inwardly*, extreme base at least of scutellum, and corium at apex, deep brown or black (the largely pale scutellum being very conspicuous by reason of the darkened clavus). Frequently confused with the next species, from which it may be best distinguished by its green colour, and shorter pronotum, the sides of which in front are rounded, and converge suddenly to the anterior collar. Of fairly general occurrence in S. Hants and I. of W. On umbelliferous plants, especially *Pastinaca sativa*.

L. (subg. *Orthops*) *kalmii*, L.—Extremely like certain dark varieties of the last, and of similar size and structure, but with the ground colour testaceous, not green; more elongate, especially in ♂, the elytra perhaps more closely punctured; pronotum longer, its sides gradually converging to the anterior collar. (Scutellum conspicuous, often with a triangular black or dark brown mark at the base; examples with the scutellum so marked usually also have the head and pronotum in front, and cuneus apically, black or spotted with black). Very common on the mainland of Hants, and recorded also for the I. of W. Amongst nettles, and on *Umbelliferae*, chiefly. Reuter enumerates ten distinct vars. of this variable insect.

[*L.* (subg. *Agnocoris*) *rubicundus*, Fall.—More robust and broader than any of the preceding: antennae very short, 2nd joint much shorter than is usual in *Lygus*, scarcely longer than head across eyes. Reddish-ochreous, more or less tinged with darker colour. L. 5mm. It has been found in May and June, and is considered to hibernate. Holwood, Hunts., Oct. 1913, by sweeping in a ditch, and by searching at the bottom of a bare hedge amongst dead leaves (H. F. Fryer.) On the continent it has occurred—presumably in summer—on *Salix*, *Quercus*, *Corylus*, *Prunus*, and some other trees.]

Camptozygum, Reut. *C. pinastri*, Fall.—Head very wide, considerably broader than apex of pronotum, and carinated throughout at vertex. Insect deeply punctured, pubescent. L. $4\frac{1}{2}$ mm. Short-oval, robust, shiny; testaceous, tinged with brown in ♂; apices of femora dotted with red. On *Pinus*; well spread in Hants, although not recorded for the I. of W.

Poeciloscytus, Fieb.—With golden and deciduous pubescence. Clavus and corium finely punctured; corium variegated. Oblong-oval, robust. Found as a rule on *Galium*.

P. unifasciatus, F.—Rather large, 6-7mm. Black, with extensive yellow markings, arranged as follows: Head with a spot by each eye on vertex, pronotum narrowly at base, scutellum at apex, base of corium, the inner and outer margins of last, and its apical margin above cuneus, creamy yellow; cuneus black externally, yellow at base and apex, otherwise orange-red. Tibiae and tarsi of legs, except at apices, ochreous; femora red or brown, marked with black. Antennae yellow at base; abdomen often with yellow spots. This very pretty

insect occurs usually on *Galium*. Lyndhurst, N. Forest (C. Morley): Lymington (H.P.J.) I. of Wight?

P. palustris, Reut.—Extremely closely allied to the last, of which it may be regarded as a very dark local race: ♂ smaller than *unifasciatus*, foreparts duller, because more rugose; pronotum entirely black, scutellum yellow only at extreme apex; corium with only a humeral streak, its apex next the cuneus, and a minute streak at the inner angle just beyond the claval suture, yellow; cuneus black, passing into red, and then yellow at each end. Antennae darker, terminal joint longer than 3rd, considerably longer than in *unifasciatus*. Femora mainly black. ♀ resembles ♂ in coloration, rugosity, and structure of antennae, but is slightly broader than in *unifasciatus*, with more rounded sides. L. $4\frac{1}{2}$ -5mm. I have not seen an example of this insect and quote from Butler (B.Br.H.-H.) ♀ at roots of rushes, Rookley Wilderness, I. of Wight (E. A. Butler.) Other Br. examples, also from roots of rushes, once occurred to Butler at Pendine, S. Wales.

[*P. vulneratus*, Pz.—“Considerably smaller than *unifasciatus*; greenish-grey, pronotum with a few darker markings, and elytra nearly unicolorous, with a bright red spot and a black line on the outer margin of the otherwise white cuneus.” On *Galium verum* growing on sand-hills at Gt. Yarmouth, Norfolk, September, 1897. (H. J. Thouless). See also *E.M.M.*, vol. 34.]

Polymerus, Westw.—Pubescence as in *Poeciloscytus*, and clavus and corium finely punctured. Corium black.

P. nigratus, Fall.—Short-oval, dull, very convex; head with two spots on vertex, extreme apex of corium, and cuneus inwardly, pale dull brown; tibiae banded with similar colour, front femora pale beneath, insect otherwise entirely black. L. $4\frac{1}{2}$ -5mm. On *Galium*, *Stachys sylvatica*, and perhaps other plants. I once took it in Hants—I believe by sweeping in damp meadows near the Lymington River, at Boldre.

Charagochilus, Fieb. (= *Poeciloscytus*, Br. Cat.), *C. gyllenhalii*, Fall.—Pubescence golden and deciduous; clavus and corium strongly punctured. Much smaller than the last: short-oval, dull, very convex; black, base of antennae, pronotum very narrowly at posterior margins, extreme apex of scutellum, tibiae, and tarsi at base, reddish-testaceous; femora with pale bands; cuneus dull reddish-testaceous, paler or darker inwardly. L. $3\frac{1}{2}$ mm. Very distinct, but a form occurs in which the membrane is much larger than is usual, and is not bent downwards in the ordinary manner, the legs and antennae longer, and the whole insect considerably longer than the typical form, which last in the net, as noted by Morley, is strongly reminiscent of a species of *Bruchus* (Coleoptera). In dry grassy places on *Galium verum* and *G. boreale*. Locally common in S. Hants and I. of W.

Liocoris, Fieb. *L. tripustulatus*, F.—Pubescence present, but very indistinct; not golden. Insect sub-glabrous. Oval, shiny, finely and (on pronotum) remotely punctured; elytra, for all practical purposes, glabrous. 2nd ant. joint shorter than 3rd and 4th together. Usually with the body black, with the pronotal collar, the pronotum down middle, apex of clavus, a large spot at the centre of the corium, extreme base of last, and cuneus across middle, yellow or orange; scutellum, except at base, clear yellow; legs and antennae brownish

testaceous, banded with black. Head very shiny, black, more or less widely pale (brown) on vertex. Frequently the yellow colour on the elytra predominates, when the insect is liable to be confused with heavily marked examples of *Lygus pastinacae*; from this almost equally common insect, however, the ecarinate vertex of the head, glabrous elytra, and fine remote pronotal puncturation, easily distinguish it. On nettles; abounds throughout the county and I. of W.

[*Camptobrochis*, Fieb. *C. lutescens*, Schill.—L. 4mm. Shiny, glabrous, strongly punctured. 3rd and 4th ant. joints very short, together much shorter than 2nd (2nd joint thickened in ♂). Oval, testaceous, tinged with brown, and spotted in places with dark brown or black; scutellum with two broad parallel black or brown stripes; cuneus often black at apex. Sometimes mistaken for *Lygus*, although of course without even fine* pubescence, and with the vertex of the head ecarinate, almost simple. On trees, principally oak. Both sexes hibernate, and may be found under bark in winter. Should occur in Hants.]

Deraeocoris, K. (*Capsus*, Br. Cat.).—Much larger, broad-oval, very convex, not less than 7mm. Body glabrous, heavily punctured. Pronotum narrow in front; head not very wide, smooth.

D. ruber, L.—Ferruginous-yellow, varying to almost black, except on legs, apex of scutellum, and cuneus, which last is red or orange basally. 2nd ant. joint gradually thickened towards apex in ♂, rather suddenly thickened in ♀, in either instance with fine hairs; scutellum not very smooth and shiny, irregularly punctured. By sweeping amongst nettles, etc. Well spread and often very common in Hants and I. of W. I have seen it in abundance on mullein (*Verbascum*) growing in gardens.

[*D. scutellaris*, F.—Coloured much as in the dark varieties of the last, although frequently with the cuneus, scutellum, and legs also black: antenna more slender, 2nd joint less thickened at apex; scutellum impunctate, very smooth and shiny: white in var. *alboscutellatus*, Reut. The last variety, however, is not found in Br., nor indeed in Europe. On heather. Very local, and does not seem to have been noticed in Hants.]

Capsus, F. (= *Rhopalotomus*, Fieb., Br. Cat.), *C. ater*, L.—Short-oval, robust, about 6mm. 2nd ant. joint strongly clubbed at apex, and hairy. Insect pubescent, finely and closely punctured or rugose, elytra with delicate grey hairs. Head very wide, its surface irregular; pronotum broad in front. Black, often with the head, pronotum anteriorly, and legs, red or reddish. Amongst long grasses and nettles; usually common in Hants and I. of W.

I insert here a table setting forth what I believe to be the most convenient method of sub-division of Division I of **Capsaria*. Section A presents some difficulties, as the pronotum in *Adelphocoris* is undeniably punctured, if slightly and irregularly so. An excessively fine granulation of the upper surface visible in certain others of the same section is not of course taken into consideration.

* The larvæ, curiously, is very hairy (H.P.J.).

*The table of *Capsaria* given by Butler in B.Br.H.-H. is too laconic, and, moreover, in my experience not entirely accurate (H.P.J.).

- A. Of large or moderate size, 7-10½mm. Impunctate, usually pubescent (hairs in some instances golden).

Pantilius—*Dichrooscytus*.

- B. Smaller, 3½-7mm. Punctured, or with the pronotum transversely wrinkled; pubescent, hairs not golden.

Plesiocoris, *Lygus* and *Camptozygum*.

- C. With golden and deciduous pubescence; distinctly punctured.

Poeciloscytus—*Charagochilus*,

- D. Glabrous, or nearly glabrous, or with the 2nd ant. joint strongly clubbed; punctured, usually deeply so.

Liocoris—*Capsus*.

Div. II, (Tribe *Capsaria*).—Cuneus not distinct from corium; elytra generally abbreviated. Subelongate, black or dark brown, legs, antennae, and elytra in part, paler; connexivum at least marked with yellow or white.

Pithanus, Fieb. *P. maerkeli*, H.S.—Pronotum not constricted. Insect black, slender, nearly glabrous; connexivum, and 1st. ant. joint except at base, yellow. Almost invariably brachypterous. L. 4-5mm. By sweeping amongst rank vegetation, particularly grasses. Well distributed and usually common in Hants and I. of W.

Myrmecoris, Gorski. *M. gracilis*, Shlb.—Pronotum sharply constricted. Much narrower than *P. maerkeli*, ant-like; 2nd ant. joint darkened on its apical half; connexivum with white markings. L. 4-5mm. Associated with ants, or their nests, and closely resembles in general form an example of *Formica*. Fleet, running rapidly on heathy ground between patches of *Calluna* (E. A. Butler); New Park enclosure, Brockenhurst, N. Forest, in nest of *Formica rufa* (G. Arnold).

Sub-Fam. III. *BOTHYNOTINA*.—Arolia absent; membrane distinctly pilose.

[*Bothynotus*, Fieb. *B. pilosus*, Boh.—♂ subelongate, parallel-sided, macropterous; ♀ short-oval, usually brachypterous. Insect very rugosely punctured and hairy. Dark brown or black, legs in ♂ paler; ♀ with head, antennae at base, and legs, red. Of very local occurrence only in Br. On conifers, and perhaps certain deciduous trees.]

Sub-Fam. III. *BRYOCORINA*.—Membrane (glabrous) one-celled; last tarsal joint slightly incrassated towards apex, claws widely diverging, arolia distinct (very long, divaricate); tibiae without spines. The Br. species are small dull-coloured insects, and inhabit ferns.

Monalocoris, Dhlb. *M. filicis*, L.—3rd ant. joint distinctly longer than 4th. Not dimorphous; broad-oval, convex, shiny, punctured. Ochreous-brown, with fine pubescence. L. 2½-3mm. On *Lustraca*, *Pteris*, and other ferns. Common in suitable localities on the mainland, and has occurred locally in I. of W.

Bryocoris, Fall. *B. pteridis*, Fall.—3rd and 4th ant. joints subequal. Dimorphous in both sexes: Undeveloped form, short, convex, narrow in front, much widened posteriorly; brownish testaceous, marked with black on head (shiny) and pronotum anteriorly; elytra scarcely reaching to apex of abdomen, rounded in outline, almost in the form of simple convex sheaths covering the body. L. 2½-3mm.

Developed form with the elytra very long, parallel-sided, the greater part of the length taken up by the cuneus and unusually large membrane; insect pitchy brown or black, corium pale ochreous at base, cuneus pale except along apical margin; legs pale ochreous. Elytra semi-transparent, shiny. L. $3\frac{1}{2}$ -4mm. On bracken (*Pteris*) and frequently on *Lastrea* with *M. filicis*. Common in the N. Forest at least. I. of Wight?

Sub-Fam. IV. *MACROLOPHINA*.—Last tarsal joint not thickened; tibiae usually distinctly spined. Prothorax with apical ring (or collar).

Tribe (a) *CREMNOCEPHALARIA*.—Arolia absent; wing cell with a hamus.

Allodapus, Fieb. *A. rufescens*, Brm.—Eyes large, very prominent, touching pronotum. Insect dimorphous: subelongate in developed form, elytra considerably longer than abdomen. Undeveloped form short, widened posteriorly, elytra only about $\frac{2}{3}$ the length of abdomen. Pale brownish red, darker in part, with long erect hairs; elytra with four white spots, a triangular one at the base, a quadrate one at the apex, of the corium of each elytron. The developed form has also as a rule a small white spot at the apex of the clavus; cuneus, and corium between the spots, of a darker brown; legs bright red, apices of femora darkened. L. 5mm. (macr.) $3\frac{1}{2}$ mm. (brach.). Macropterous form very rare in Br. On heaths, on ground between clumps of *Calluna*. N. Forest: Matley Bog, on *Myrica* (Morley).

Systellonotus, Fieb. *S. triguttatus*, L.—Eyes not touching pronotum. Sexually dimorphous. Dark chocolate brown, elytra beyond cuneus paler, with silvery white spots situated (in ♂) much as in *Allodapus*. ♂ elongate, macropterous, elytra parallel-sided, corium in each instance with a subquadrate silvery spot at base and apex, clavus with two smaller half-moon-shaped spots towards apex. ♀ with only the merest rudiments of elytra bearing two large, irregular, silvery spots forming almost a band; subelongate, with the abdomen globose. L. 4mm. Myrmecophilous, the ♀ very ant-like. On heaths, running on ground in the neighbourhood of ants' nests. Fleet, near nest of *Acanthomyops niger* (Butler); N. Forest, by myself and other collectors. *A. niger* and *Tetramorium caespitum* appear to be the more usual hosts.

Tribe (b) *MACROLOPHARIA*.—Arolia present; wing cell without a hamus. On low plants, none apparently being myrmecophilous.

Macrolophus, Fieb. *M. nubilus*, H.-S.—Eyes remote from pronotum; head not constricted behind eyes, which are small. Insect elongate, very delicate; pronotum with a rather long parallel-sided collar and a strong transverse discal impression. Green or greenish ochreous (fading to yellow after death) with fine semi-erect pubescence; basal joint of antenna deep black, and a stripe on each side of head behind eye brownish-black; apex of corium, and last tarsal joint, brownish. L. $3\frac{1}{2}$ -4mm. On bramble, *Stachys sylvatica*, and perhaps nettle. Lympington, on *Rubus* (H.P.J.).

Dicyphus, Fieb.—Eyes remote from pronotum; head constricted behind eyes, which are large. Pronotum with a strong transverse sulcature. Insect elongate, delicate, very pubescent; pale dull green or ochreous, with darker markings, elytra almost transparent, with semi-erect black hairs; legs usually long, femora spotted with black or

brown. A species as a rule is confined to a particular foodplant, hence is frequently local, although very common where it occurs.

Group I.—Antennae long, slender, reaching beyond apex of clavus. L. 4-5mm.

D. constrictus, Boh.—Transverse sulcature of pronotum situated behind the middle. ♂ macropterous, ♀ dimorphous. In colour much like the next species: shorter, pronotum wider in front, eyes more prominent; basal ant. joint pale, but not red. On *Lychnis dioica*, *Digitalis*, and some other plants, in woods. N. Forest (H.P.J.). I. of Wight: Marvel Copse, on *Lychnis* (Butler).

D. epilobi, Rent.—Transverse sulcature of pronotum placed nearly in the centre. Green or greenish-ochreous, a minute spot on the corium at apex, and usually one on the apex of the cuneus, brown (inner margin of corium often darkened). 1st ant. joint red, 2nd often brownish at the base and apex: base of pronotum much narrower than in the next species, barely twice as long as the anterior margin. Confined to *Epilobium hirsutum*, but very common in Hants on its foodplant. I. of Wight: many localities.

D. errans, Wlff.—Transverse sulcature of pronotum placed as in *epilobi*. Insect usually much darker, brownish-ochreous: head, pronotum anteriorly, and scutellum, strongly marked with black or dark brown. 1st and 2nd ant. joint brown in middle, antennae otherwise almost black, and about as long as abdomen. Chiefly on nettles. S. Hants and I. of W., usually common.

Group II.—Antennae and legs shorter; antennae not reaching to apex of clavus. Insect usually considerably smaller, particularly in brachypterous form.

D. stachydis, Rent.—Head pale (ochreous) with two dark lines down middle, and one behind each eye; posterior tibiae with long spines, and rather long pubescence. Usually brachypterous in either sex: ochreous, elytra almost unicolorous, head marked as mentioned with darker colour, and pronotum laterally brown or spotted with brown; 1st and 2nd ant. joints dark at base and apex, 3rd and 4th dusky. L. $4\frac{1}{2}$ mm. (macr.) $3\frac{1}{2}$ mm. (brach). On *Stachys sylvatica*, and occasionally nettles. Carr (cf. B.Br.H.-H.) also records it from *Ononis*. Locally common in S. Hants and I of W.

D. pallidicornis, Fieb.—Head pale, marked as in *stachydis*; hind tibiae with short spines, and very short pubescence. Macropterous, but colours much as in last insect: paler, corium often with a slight reddish tinge, frequently with a spot at the apex of the corium, and with the cuneus at apex, brownish; antennae paler throughout, 1st joint often red instead of brown at apex. L. 4mm. On Foxglove (*Digitalis purpurea*). Usually common on its foodplant in the Hampshire woods, and in I. of W.

D. globulifer, Fall.—Head black, with two pale spots on vertex by each eye; pronotum transversely rugose; legs with the femora heavily spotted with black, but with the tibiae unicolorous. L. $3\frac{1}{2}$ mm. Very distinct from any of the foregoing, and, with the next insect, deserving of sub-generic rank. Elongate-ovate, legs and antennae short (the last rather stout); brownish-ochreous, head as mentioned, pronotum widely on each side anteriorly, and scutellum down middle, black. Macropterous. Generally on *Lychnis dioica* growing in woods. New Forest, and woods near Southampton; also in I. of Wight (H.P.J.).

D. annulatus, Wlff.—Head black, or densely freckled with black, showing always three pale spots; pronotum not rugose; tibiae spotted with black. Smaller and paler than *globulifer*, sides less rounded; antennae ringed with yellow and black; scutellum brownish, with paler spots; pronotum more or less freckled with brown, not black anteriorly. On *Ononis*. I. of Wight; Sandown (Champion); cliffs at Culver and Shide (J. M. Brown).

Campyloneura, Fieb. *C. virgula*, H.-S.—Eyes larger, touching pronotum. Elongate, shiny, with very fine pale pubescence, and long antennae and legs; 2nd ant. joint extremely long. Head black, with two pale spots; 1st ant. joint orange yellow, 2nd black, yellow at extreme apex, 3rd and 4th joints pale; pronotum orange-red, collar and base almost white; scutellum orange at base, paler at apex, basal angles brown; elytra pale ochreous, clavus brown or tinged with brown; cuneus yellow, its apex red; legs pale, unspotted. L. 4mm. On oak, and many other trees and bushes, including holly. Very common in woods, etc., in Hants and I. of W.

Sub-Fam. V. *HETEROTOMINA*.—Pronotum without an apical collar or ring. Arolia free, slender, parallel or approximating at apex; wing cell without a hamus.

Tribe (a) *HALTICARIA*.—♀ body at least generally broad-oval; genae high; hind femora dilated. Head very short and wide, in most instances fitting extremely closely to pronotum, or even overlapping the last. Insect chiefly black, capable of leaping, and associated with low plants—especially *Rubiaceae*.

Orthocephalus, Fieb.—Head neither overlapping nor fitting very closely to apex of pronotum. ♀ rarely developed, short, broad, convex; ♂ macropterous, more slightly built, elytra very long and parallel-sided. Entirely black, or with the legs, and elytra in part, brown or paler; impunctate, rather dull, with long black suberect hairs, and pale deciduous scale-like pubescence; posterior legs long. L. 5-5½mm. The broad squat form of the ♀, with its long hind legs, and short elytra, makes this sex unmistakable, but the ♂ is often a puzzle to students—probably because it is so much less frequently taken.

O. saltator, Hhn.—Tibiae reddish-brown or ochreous. ♂ elytra (with membrane) black. By sweeping amongst *Trifolium*, *Ononis*, and some other plants. Not uncommon, both on the mainland and in I. of W. Lymington district (H.P.J.). Sandown, etc. (Champion).

[*O. mutabilis*, Fall.—Legs entirely black. ♂ shorter than in *saltator*, pronotum shorter, less widened behind; corium inwardly paler, membrane paler, clouded with brown. ♀ deep black throughout, slightly larger than in *saltator*. On *Tanacetum*, *Ononis*, etc. Of very local distribution, but almost certain to occur in Hants.]

Strongylocoris, Cost.—Head very wide, short, partly overlapping front of pronotum. Insect oval, very short, rugosely punctured. Antennae not as long as body.

S. leucocephalus, L.—Black, head and legs testaceous, insect with very short black hairs. L. 2½mm. On *Vicia cracca*, *Galium*, and (?) *Helianthemum*; has also been taken by general sweeping in dry grassy situations. Bournemouth (Dale); "Hants" (B.Br.H.-H); Sandown, I. of W. (Champion).

S. luridus, Fall.—Ochreous, marked with brown, densely clothed with pale hairs; less shiny, rather more finely and closely punctured. L. 3½mm. From flowers of *Jasione montana*, and by general sweeping. Hayling Is. (Saunders); "Hants" (B.Br.H.-H.).

Halticus, Hbn.—Head wide, fitting very closely to, and more or less overlapping, pronotum; antennae extremely long and slender, nearly twice the length of the body. Insect very short, oval, shiny, largely and shallowly punctured. Vertex of head flattened, and bearing posteriorly a transverse carina, as in *Lygus*, etc. L. 2½-3mm.

H. luteicollis, Pz.—Black, with the head, pronotum except at extreme base, legs except base of hind femora, and antennae, yellow; 2nd ant. joint usually black at extreme apex. Insect when fresh with short, golden, scale-like pubescence. Macropterous. On the various kinds of bedstraw (*Galium*). Bembridge, I. of W. (Dale). Haven St. (J. M. Brown).

H. saltator, Geoffr. in Fourc.—Black: head rufo-testaceous, the sharply carinated vertex, the clypeus, and the cheeks (genae) more or less piceous; anterior and intermediate femora, as well as anterior coxae, yellow. Hinder portion of pronotum transversely strigose. Usually brachypterous, but with the elytra longer than in the next species, and almost entirely covering the body. Pubescence golden. Winchester, common on foliage of potato, July, 1925 (F. O. Mosley, teste Butler). Until of recent years scarcely known in Br.

[*H. apterus*, L.—Black, very shiny, with only antennae, apex of femora, tibiae and tarsi, pale (yellow). Elytra usually abbreviated, very convex, with extremely short semi-adpressed black hairs. Pronotum not strigose posteriorly. In grassy flowery places on a chalky or sandy soil. Mention has been made of the following foodplants: *Galium verum*, *Vicia cracca*, *Ononis*, *Spartium*, *Centaurea*.]

Tribe (b) HETEROTOMARIA.—Body generally oblong or elongate; genae low; posterior femora, except in certain examples of *Orthotylus*, not dilated. An interesting assemblage of insects, mainly small, but often of attractive form and colours. Certain of the species inhabit trees, others occur on shrubs or low plants, or even on the ground. In the descriptions of the genera the characters most peculiar are placed first. Pal. 110? (*Callocoraria*, O.C.).

Pilophorus, Westw.—Head overlapping pronotum. Vertex of head flattened; eyes very prominent, projecting beyond pronotum for nearly their entire width; 2nd ant. joint distinctly thickened. Insect oblong, convex, black and brown, elytra with narrow transverse silvery bands. *Pilophori* appear to feed largely on *Aphididae*, and are associated to a certain degree with ants—some regarding them as "cattle-raiders" of the last; in colour and form the bugs themselves are decidedly ant-like.

P. cinnamopterus, K.—Entire apical width of corium shiny. Head dark brown; antennae black and brown, whitish at apex; pronotum black, convex, narrow in front, sides straight; scutellum black, with lines of silvery pubescence; elytra dull cinnamon brown, darker at apex, with a short narrow anterior band, arrested at the claval suture, and a complete posterior band, carried across the apex of the clavus, of silvery pubescence; legs dark brown. L. 5mm. By beating branches of trees above nests of *Formica rufa*. Parley Heath (Donisthorpe); N.

Forest (Butler). A larva of either this or the next species is recorded by Butler from Parkhurst Forest, I. of W.

P. clavatus, L.—Inner half of corium at apex dull; apical silvery band of elytra not continued in one line across the clavus, which last is banded at a higher point. Of a darker ground colour than in *cinnamopterus*, head and pronotum with a bronzy tint; a narrower insect, with fine scattered golden pubescence; hind tibiae narrower; sides of pronotum slightly sinuate. L. 5-5½mm. Myrmecophilous. On trees and bushes, near ants' nests. N. Forest (E. A. Butler, C. Morley, and others).

P. perplexus, D. & S.—Inner half of corium at apex dull, but silvery bands of clavus and corium in one line. Smaller than *clavatus*, less pubescent, without golden hairs; colours somewhat brighter, head and pronotum scarcely bronzy; 2nd ant. joint longer, clavate. The ground colour varies greatly in its intensity. On trees and bushes (often hedges) usually with ants. Common on apple trees in a Southampton garden, July 13th and 27th, 1929. (H.P.J.). "Hants" (B.Br.H.-H.).

Cyllocoris, Hhn.—Insect elongate, 7mm. Head, as also in the following genera, not overlapping pronotum. Antennae very long; 2nd joint longer than 3rd and 4th together, and thickened towards apex. Pronotum slightly constricted, with rather prominent callosities; elytra in both sexes fully developed. The two Br. species are extremely pretty insects, and occur (frequently together) on oak. They appear about the middle of June, or a little earlier.

C. histrionicus, L. ("Harlequin bug")—Reddish brown and yellow, variegated; head, strongly impressed base of scutellum, and parts of pronotum and antennae, black. Insect shiny, glabrous. Extremely common in Hants as elsewhere. I have beaten it from birch and wych elm, as well as from oak.

C. flavo-quadrinaculatus, D.G. (= *flavonotatus*, Boh.)—Head, pronotum, and scutellum black; legs brownish-testaceous; elytra black-brown, with four large sulphur yellow spots, two on each elytron, one situated at the base of the corium, and one covering most of the cuneus; lateral margins of corium often very narrowly pale. Insect with sub-erect hairs, dull. Throughout S. Hants on oak, but less generally abundant than *histrionicus*.

Ætorhinus, Fieb. *Æ. angulatus*, Fall. (= *Blepharidopterus*, O.C.)—L. 5mm. Antennae very long, 3rd and 4th joints not thinner than apex of 2nd, 2nd scarcely longer than 3rd. Pronotum with a strong transverse sulcation, callose in front; vertex of head carinated. Insect sub-elongate, delicate, pubescent; green above, with bases (and often apices) of 1st and 2nd ant. joints, acute posterior angles of pronotum, and extreme base of tibiae, black. On various trees and bushes, more particularly *Salix*, *Alnus*, *Betula*, and *Ulmus*.—Common in Hants and I. of Wight.

Globiceps, Ltr.—Callosities of pronotum very prominent; 2nd ant. joint much longer than 3rd and 4th together, clavate in ♀. With one exception the Br. species somewhat resemble in colour and markings *Cyllocoris flavo-quadrinaculatus*, but have the tints dull. Vertex of head usually carinated, completely so in ♂; ♀ generally brachypterous. Insect oblong, not exceeding 6mm. None of the species can be considered rare, but are, from their habits, liable to be overlooked.

G. flavomaculatus, F.—Black, legs and basal ant. joint reddish; elytra with four large, pale yellow spots. ♂ elytra longer, head very shiny; ♀ with head very globose, much raised on vertex between eyes. Insect without silvery pubescence. L. 6mm. ♂; ♀ 5mm. (brach.) Amongst grass, at roots of plants, and on *Umbelliferae*. Milford, 1923 (H.P.J.).

[*G. cruciatus*, Reut.—Much like the preceding, but smaller; ♂ elytra shorter, head not very shiny; ♀ head not very globose, vertex only slightly raised. Insect with silvery deciduous hairs. Amongst stems and roots of willows (often on sand-hills) and other plants.]

[*G. dispar*, Boh.—Elytra whitish, nearly transparent, with a wide cloud across the apex of the corium; colours otherwise much as in last. Vertex of head in ♂ not carinated; ♀ elytra generally very short. L. $3\frac{1}{2}$ -4mm. At roots of plants, usually near the sea.]

Mecomma, Fieb. *M. ambulans*, Fall.—2nd ant. joint not longer than 3rd and 4th combined; face nearly vertical—i.e., almost at right angles to vertex of head. Sexes very dissimilar; ♂ black, legs ochreous, elytra pale brownish-ochreous, darker along nerves and margins, elytra very long and parallel sided. ♀ black, 3rd and 4th ant. joints and legs ochreous; elytra widened behind, coal black, in brachypterous form with the apices rounded, not covering half of the black and intensely shiny abdomen; 2nd ant. joint clavate. The squat brach. ♀ bears a passing resemblance to that sex in *Halticus*, but lacks of course the jumping hind-legs of the last, and has very different antennae. In marshy situations amongst rushes, ferns, etc. Locally common in S. Hants and I. of Wight.

Cyrtorrhinus, Fieb.—2nd joint of antenna not longer than 3rd and 4th together: thinner than in *Mecomma*, not clavate in ♀; face very similar, but distinctly less vertical; sexes not very unlike. Elytra less delicate than in ♂ *Mecomma*, not so long, more uniformly brown or ochreous. The Br. species inhabit marshy places.

C. caricis, Fall.—L. $3\frac{1}{2}$ -4mm. ♂ elongate, ♀ elongate-ovate; head, antennae, pronotum, and scutellum black; elytra green outwardly, otherwise brown, very dark towards suture; head with a conspicuous pale spot by each eye; antennae longer than body; legs green or (♂) brownish-green; cell-nerves of membrane green; tibial spines very indistinct. Amongst rushes, etc., ♀ near roots. Of local occurrence in both S. Hants and I. of Wight.

C. pygmaeus, Zett.—Smaller, $2\frac{1}{2}$ -3mm. Oblong-oval, pale testaceous, head, antennae except at apices of basal joints, and pronotum often posteriorly, black. With very fine brownish hairs; eyes large, prominent; tibial spines blackish. At roots of rushes, etc. "Hants" (B.Br.H.-H.), I. of Wight: Rookley Wilderness (Butler).

[*C. geminus*, Flor.—Much like *pygmaeus*, slightly larger; antennae almost entirely pale (ochreous), basal joint considerably longer; legs much longer; spines of hind tibiae larger, darker. Dimorphous. Little known in Br.]

[*C. flavolus*, Reut.—L. 3-4mm. Eyes and antennae blackish, insect otherwise entirely yellow; tibiae with very fine brownish spines. Chiefly inhabits salt marshes.]

**Orthotylus*, Fieb.—2nd ant. joint not longer (or scarcely longer)

* I hope in a future paper to deal fully with this somewhat neglected genus.

than 3rd and 4th combined, apex only slightly thickened; face, as in all the following genera, not perpendicular. Eyes (large) touching pronotum, or almost so; 3rd and 4th joints of rostrum together longer than 2nd, not incassated. Long-oval, pubescent, elytra often parallel-sided in ♂; vertex of head usually carinated. L. 3-6mm. The form of the ♂ genital forceps is very remarkable, and as reference to these is often needful it is essential that the ♂♂ be mounted with the wings spread. Habitat, trees and bushes and some low plants. The larger members of this extensive genus are sometimes confused by beginners with *Lygus*; apart from the absence of a pronotal collar in *Orthotylus*, however, the impunctate integument and comparatively narrow form of the various species should readily distinguish them. The correct linear arrangement is indicated by the figures (= O.C.).

Group I.—Elytra and pronotum brown, or with brown markings, not entirely green, or red.

[1. *O. fuscescens*, K.—Insect entirely olive-brown. Oblong or oval, broad, L. 4-4½mm. On *Pinus*; very rare in Br.]

2. *O. bilineatus*, Fall.—Greyish or greenish-brown, with yellow and dark brown markings: head yellowish, with a dark central line; scutellum yellow, marked triangularly down middle with olive-brown; clavus dark brown inwardly, pronotum with posterior angles, and often callosities, dark. Narrow, parallel-sided, about 5mm. Inhabits aspen, and perhaps other poplars. Southampton in garden (H.P.J.).

Group II.—Elytra and pronotum entirely green (yellowish when faded) or, in one instance, red.

A. Pubescence of elytra unmixed with black hairs; cell-nerves of membrane, unless otherwise stated, green.

7. *O. nassatus*, F.—Peculiar in having the basal joint of the antenna black beneath. L. 5mm. On oak, ash, willow, and other trees. N. Forest (Rev. A. Thornley); Southampton (H.P.J.).

5. *O. marginalis*, Reut.—L. 6-6½mm. Anterior femora with a row of long bristly hairs along their under margins; larger than the next species, broader, of a darker green, base of pronotum straight. (Apart from its green cell-nerve, most resembles *flavinervis*, but in the ♂ usually has the 1st ant. joint pale, also striking differences in the genital claspers). On willow, apple, and other trees. Said to be becoming an orchard pest. Common throughout Hants, and occurs in I. of Wight.

12. *O. diaphanus*, Kb.—L. 4mm. Anterior femora with long hairs beneath; insect elongate, narrow, very pale green, transparent; base of pronotum widely sinuate. Antennae shorter than in *viridinervis* following, 1st joint shorter than head, 2nd without long exserted hairs. On *Salix*. N. Forest (H.P.J.).

[8. *O. viridinervis*, Kb.—Shape much as in *diaphanus*, and anterior femora hairy beneath, but insect darker, rather larger, with longer pubescence; antennae longer, 1st joint as long as head, 2nd with long exserted hairs. L. 5-6mm. Inhabits *Ulmus montanus* chiefly.]

11. *O. ochrotrichus*, Fieb.—Anterior femora without long hairs beneath; vertex of head carinated. Insect green, 5mm. On trees—e.g., elm, oak; also on shrubs and low plants. Common in Hants and I. of Wight.

[9. *O. prasinus*, Fall.—Anterior femora glabrous beneath; vertex of head almost simple—i.e., ecarinate. ♂ right side of genital claspers

prolonged into two rather straight-sided processes of unequal length: ♀ with apical joint of antenna considerably longer than basal joint. L. 5mm. Principally on *Ulmus campestris*.]

10. *O. scotti*, Reut.—Much resembles *prasinus* with the vertex of head also immarginate. ♂ right side of claspers with two short processes of almost equal length; ♀ with apical ant. joint scarcely longer than basal. On elm, and some other trees; also on nettles. Southampton (H.P.J.).

6. *O. tenellus*, Fall.—Cell-nerves of membrane yellow; small, narrow, very pale, almost cream-colour, tinged with green, elytra very delicate and transparent. L. 5mm. (Eyes black, conspicuous; anterior femora hairy beneath.) Found mainly on oak. N. Forest (H.P.J.). I. of Wight: Marvel Copse (Butler).

4. *O. flavinervis*, Kb.—Cell-nerves of membrane yellow; large, comparatively wide; elytra green, not very thin and transparent. L. 5½-6mm. Of much the same size and shape as *marginalis*, but with the head and other parts, as well as the cell-nerves, yellow; 1st ant. joint black in ♂, which is rarely the case in *marginalis*. ♂ right side of forceps three-pronged. Occurs on alder, and perhaps willow. N. Forest (H.P.J.). I. of Wight: Rookley Wilderness (Butler).

[3. *O. virens*, Fall.—Sexes dissimilar. ♂ elongate, parallel-sided; dull green, antennae black, head inclining to fuscous, sometimes black, with yellowish margins to eyes; callosities and base of pronotum (not infrequently the whole of both pronotum and scutellum) more or less fuscous; membrane blackish, with cell nerves partly yellow; genital segment very large, right side of claspers with a strong spine on outer margin (see also *E.M.M.*, vol. 53). ♀ said to be much like that sex in *O. flavinervis*, but smaller, narrower, pubescence longer, more scattered; cell nerves yellowish. 5mm., or slightly less. A northern insect in Br., inhabiting willows.]

B. Pubescence of elytra mixed with black hairs. Insect on the average considerably smaller, less narrow, 3-5mm. Cell-nerves usually concolorous, or almost so.

13. *O. flavosparvus*, Shlb.—Entire cellular area of membrane green. Insect bright green, with black hairs, interspersed with small spots and patches of silvery scale-like pubescence—the last easily rubbed off. L. 4mm. On *Chenopodiaceae*, especially near coast. Lympington (H.P.J.) I. of Wight; Luccombe chine (Butler); St. Helens and Sandown (J. M. Brown).

[16. *O. adenocarpis*, Perr.—Cells of membrane concolorous; 3rd and 4th ant. joints together shorter than 2nd. Pale yellowish green, with both pale and dark hairs, the first predominating. Elytra subparallel-sided ♂, more rounded in outline ♀. L. 4-5mm., ♀ the smaller. Inhabits broom.]

14. *O. virens*, D. & S. (= *O. chloropterus*, Br. Cat.)—In common with the species that follow has the 3rd and 4th ant. joints together as long as or longer than 2nd. Posterior femora scarcely thickened: rostrum reaching slightly beyond anterior coxae, thicker. L. 4½-5mm. Of a deep sage-green in life, membrane dark, nerves almost concolorous. The colour alone should distinguish it. Confined to broom. "Hants" (B.Br.H.-H.).

[15. *O. concolor*, Kb.—Antennae and hind femora as in last; rostrum thinner, reaching to intermediate coxae. Insect of a much

paler bluer green, membrane much paler, cell-nerves often yellowish. L. $4\frac{1}{2}$ mm. On broom and gorse. I know of no Hants captures.]

18. *O. ericetorum*, Kb.—Antennae as in *concolor*; rostrum reaching beyond hind coxae; hind femora thickened. Oblong-oval, vertex of head immarginate. Bright green, with black hairs, sides of corium and cuneus, and cells of membrane, yellow. L. $3\text{--}3\frac{1}{2}$ mm. Occurs on *Calluna*, *Erica*, and some other plants. Locally common in S. Hants and I. of Wight.

17. *O. rubidus*, Put.—Rostrum and hind femora much as in last, and size similar: short-oval, red, or (var. *moncreaffi*) green, with black and silvery hairs; vertex of head strongly carinated; cell-nerve not yellow. In salt marshes, amongst *Salsola*, *Arenaria*, *Salicornia*, etc. Locally common along the Hampshire coast, where the green form was first taken by Moncreaff, at Portsmouth, from *Salicornia radicans*. Both vars. occur freely in the salterns at Lymington. I. of Wight: Yarmouth, var. *moncreaffi* only (Butler); Bembridge (Donisthorpe).

Hypsitylus, Fieb., *H. bicolor*, D. & S.—With chief characters of *Orthotylus*; 3rd and 4th joints of rostrum together not longer than 2nd, each slightly thickened towards their juncture, giving the rostrum a rather clubbed appearance. Dull greyish-green, with black and silvery hairs, the last dense on head; elytra long and parallel-sided in ♂, short rather rounded at sides in ♀. L. $3\frac{1}{2}\text{--}4\frac{1}{2}$ mm. On *Ulex europaea* and broom. N. Forest (H.P.J.).

Malacocoris, Fieb., *M. chlorizans*, Fall.—Eyes not nearly touching pronotum, small but prominent (head behind eyes rounded in outline, and swollen); 2nd ant. joint not longer than 3rd and 4th together, scarcely thickened at apex. Insect long-oval, very thin, transparent, with slender legs and antennae. Pale green, elytra spotted or marbled with darker green; 1st ant. joint black beneath, above with a dark green central spot; 2nd, 3rd and 4th joints (in life) pale testaceous, 2nd black at extreme base; eyes dark brown, tibiae and tarsi very pale testaceous, tarsi dark at extreme apex. L. $4\frac{1}{2}\text{--}5$ mm. Newly emerged examples of this attractive insect have the green spots on the elytra somewhat feebly defined, so that the character of the eyes affords the surest means of identification; the dark spots on the 1st and 2nd ant. joints are very characteristic, but are found also in *Aetorhinus*, and *Orthotylus nassatus* has, of course, the 1st joint black beneath. Chiefly on leaves of hazel, but occurs also on ash, apple, elm, and some other trees. N. Forest, and at Southampton (H.P.J.). Uncommon in I. of Wight according to Butler, who however has taken it at Combley Wood.

Loxops, Fieb. *L. coccineus*, Mey.—2nd ant. joint much longer than 3rd and 4th together, not greatly dilated and flattened; insect red, or mainly red. Oval, flat, rather broad, with a superficial resemblance to a *Psallus*; yellow, densely mottled with red or almost entirely red. L. $4\frac{1}{2}$ mm. On fruiting ash-trees. I have taken it in Hants.

Heterocordylus, Fieb.—Antennae as in *Loxops* (2nd joint fusiform in ♀ of *H. genistae*). Insect black, broad-oval, with both black hairs and white scale-like pubescence. On broom, *Genista*, etc.

H. genistae, Scop.—Entirely black; ♀ with 2nd ant. joint fusiform. L. $4\frac{1}{2}$ mm. "Hants" (B.Br.H.-H.); near Hurst Castle, July, 1929, on *Ononis* (H.P.J.).

H. tibialis, Hhn. (= *H. leptocerus*, Kb., O.C.).—Tibiae testaceous;

♀ with 2nd ant. joint simple. Insect larger, 5-5½mm. Beaulieu, N. Forest (C. Morley).

Heterotoma, Ltr. *H. merioptera*, Scop. 2nd ant. joint much longer than 3rd and 4th together, remarkably dilated and flattened. (1st much swollen, both joints hairy). Insect subelongate, black-brown, rather metallic, with fine brownish hairs intermixed with short whitish pubescence; legs greenish or yellowish. Membrane subrugose on its outer edge, dark. L. 6mm. On nettles, and many other low plants. Common in Hants and I. of Wight.

Sub-Fam. VI. PHYLINA.—Prothorax (as in *Heterotomina*) without an apical ring: arolia united with claws; wing cell with a hamus. Antennae usually slender, not very long, rarely with the 2nd joint of undue length or thickness; pronotum with only feeble callosities, frequently almost simple; tibiae in certain genera very strongly spined for the size of the insect. Oblong or oblong-oval, usually small (average length about 4mm.), fragile; chiefly red, brown, or ochreous, or black variegated with these colours. Habitat to a large extent on trees and bushes. Pal. 400. Of the 50 Br. species all are included in the one great tribe *Phylaria*, Reut., here regarded as affording four sub-divisions.

Division I.—Elytra dull, or very slightly shiny, never covered with deciduous scale-like pubescence.

Onychumenus, Reut. *O. decolor*, Fall.—Peculiar in having the (attached) arolia longer than the claws. Grey or yellowish-grey, tinged in part with brown; scutellum sometimes entirely brown but for two yellow basal spots. Sub-elongate, elytra parallel-sided. L. 5mm. On *Hieracium*, *Polygonum*, etc., in dry situations. Milford (H.P.J.). I. of Wight: Rookley Wilderness (Morey).

[*Oncotylus*, Fieb. *O. viridiflavus*, Gze.—The largest Br. species, and further distinguished by having the tibiae spotted with black. L. 8mm. Oblong or oblong-oval, with dark hairs; dull greyish-green, head and pronotum yellowish, the former with a number of small black spots and with the central lobe dark, the latter with the hinder angles, a large transverse spot behind each callosity, and a spot on the base at each side, black; scutellum yellow, black at sides; legs, and prothorax usually, dotted throughout with black; tibiae with dark spines. Could only be confounded with a species of *Calocoris* (*Mirina*). Frequents flowers of *Centaurea niger*.]

Conostethus, Fieb.—Upper surface sub-glabrous, the pubescence exceedingly fine. Sub-elongate, 3½-4¾mm.

[*C. salinus*, Reut.—3rd ant. joint longer than 2nd, and slightly curved: antennae longer, 3rd joint more than twice as long as 4th in ♂, twice as long in ♀. L. 4¼-4¾mm. Yellowish-grey; head yellow with two dark spots on vertex; the long antennae thick and nearly black in ♂, shorter, thinner, brownish, with basal joints ochreous, in ♀; pronotum with callosities dark, side margins and a dorsal line pale; scutellum dark, with a pale base or dorsal line, or entirely pale. Inhabits salt marshes.]

[*C. brevis*, Reut.—Much like *salinus*, but shorter, and otherwise differing as follows: Antennae shorter, 3rd joint about twice as long as 4th in ♂, not twice its length in ♀; elytra distinctly shorter in

proportion to their width, and in brach. ♀ not covering apex of abdomen. L. $3\frac{1}{2}$ -4mm. So far has only been found in Scotland.]

[*C. roseus*, Fall.—3rd ant. joint shorter than 2nd, and straight; antennae slender, much shorter. Elytra pink or pinkish-brown, sides of corium and cuneus paler; pronotum green in ♂. L. $3\frac{1}{2}$ -4mm. In dry sandy or chalky places by sweeping grass, etc. Common where it occurs].

[*Hoplomachus*, Fieb. *H. thunbergi*, Fall.—Upper surface, as in the four following genera, very distinctly pilose; claws normal; rostrum not extending beyond hind coxae; colour more or less ferruginous-brown. Oval; head black, vertex and a narrow line down middle, pale greenish-brown; pronotum in front and a narrow dorsal line pale, callosities blackish; scutellum with the dorsal line, and a spot on each side, often pale; elytra (brown) with margins, nerves, and sutures paler, membrane with cell-nerves whitish. Surface densely clothed with black hairs. L. $4\frac{1}{2}$ mm. Occurs in dry places amongst low vegetation, particularly on flowers.]

Tinicephalus, Fieb. (*Megalocoleus*, Br. Cat.) *T. hortulanus*, Mey.—Claws normal; rostrum not extending beyond hind coxae; colour paler, not ferruginous brown; xyphus convex. Oval, with black and paler hairs intermixed; brownish-green, head and antennae yellowish or yellowish-green; pronotum dull green in ♂, with a V-shaped dark mark between callosities; elytra dusky green, cell-nerve of membrane whitish; tibiae with black spines. 2nd tarsal joint longer than 3rd. L. $3\frac{1}{2}$ -4mm. On *Helianthemum* and *Ononis* chiefly. N. Forest (H.P.J.) "Hants" (B. Br. H.-H.).

Megalocoleus, Reut.—Claws and rostrum as in last, and colour pale; xyphus concave. Oval, pubescent, tibiae with black spines, 2nd tarsal joint longer than 3rd.

M. molliculus, Fall.—Clothed with soft pale pubescence mixed with fine dark hairs; front coxae and femora with pale setae. Pale greyish-yellow or greyish-green, long-oval ♂, oval ♀; 2nd ant. joint thickened in ♂; elytra with clavus, cuneus, and a central band sometimes brownish. L. 4-5mm. On *Achillea*, *Tanacetum* (flowers of) *Ononis*, etc. S. Hants, not uncommon, and in I. of Wight.

M. pilosus, Schr. (= *tanacetii*, H.-H.Br.Is.).—Clothed with thick black hairs; front coxae and femora with black spines. L. $4\frac{1}{2}$ - $5\frac{1}{2}$ mm. Oval, much like *molliculus*, but usually more yellow. On flowers of tansy (*Tanacetum*) "especially by riversides"; also on *Achillea millefolium*. I. of Wight: Sandown (J. M. Brown).

Amblytylus, Fieb.—Claws normal; rostrum very long, extending in Br. species beyond hind coxae. Oval or oblong-oval, pubescent; sides of pronotum slightly reflexed. L. $4\frac{1}{2}$ - $5\frac{1}{2}$ mm. Chiefly by sweeping grasses in dry situations.

[*A. delicatus*, Perr.—Membrane milky white, with a brown spot across apex of cells. ♂ narrow, sub-elongate, ♀ sub-oval; pale yellowish-green, with fine whitish hairs, and a few longer brown bristles; pronotum green and ochreous; elytra pale ochreous, inclining to green on clavus, cuneus and apex of corium brownish; cells of membrane brown across apices, and a brown band extends from the apex of cuneus to apex of larger cell. L. $4\frac{1}{2}$ -5mm. Formerly taken by E. Saunders at Woking on *Gnaphalium germanicum*; elsewhere has occurred only in S. of France.]

A. brevicollis, Fieb. — Membrane more or less dusky, unspotted; ♂ much narrower than ♀, both sexes clothed with pale hairs. ♂ greenish-grey, ♀ ochreous; elytra darker on clavus and inner portion of corium. L. 4.4½mm. ♂ not unlike that sex in *Orychocampus decolor*, which last, however, apart from other important differences, has the eyes remote from the pronotum. Both insects frequent very similar situations. "Hants" (B.Br.H.-H.)

A. affinis, Fieb. — Membrane dark, as in *brevicollis*; ♂ and ♀ almost alike in form, sub-oval, densely clothed with brown-black hairs. Larger than *brevicollis*, ochreous, without (except in very freshly disclosed examples) decided green tints in either sex; ♂ often with pronotum and elytra brownish. By sweeping grasses in dry places, also at roots of plants. N. Forest (Butler). Recorded for I. of W. in Vict. Hist. of Hants.

Macrotylus, Fieb. — Claws exceedingly short (strongly curved, with a sharp basal process). Oblong-oval, greyish-green or green, with black hairs.

[*M. solitarius*, Mey. — L. 5.5½mm. Elytra evenly (and densely) clothed with black hairs. Greyish-green; elytra with nerves and cuneus at base slightly paler, membrane dusky, with darker and paler spots. On *Stachys sylvatica* and *Ononis*. Local.]

M. paykulli, Fall. — Much smaller, 3½-4mm. Elytra with numerous irregular patches of coarse black hairs. Green; antennae with 1st joint, and base of 2nd, darker; pronotum in ♂ with callosities and a dorsal line sometimes blackish; membrane dusky, outer margin with a darker spot set off by two hyaline spaces on either side, cell-nerves white. On or under *Ononis*. Lymington (H.P.J.) I. of Wight: Sandown (Butler).

Division II. (*Phylaria*). — Elytra shiny, never clothed with pale deciduous pubescence; tibial spines pale, or (in *Harpocera*) insect with 2nd ant. joint shorter than 3rd.

Harpocera, Curt. *H. thoracica*, Fall. — L. 7mm. 2nd ant. joint shorter than 3rd, in ♂ bent and angularly produced on underside at apex. Oblong-oval, brownish, with darker and paler markings; ♂ with head and pronotum black except for a yellow dorsal streak on each, and front tibiae very long and curved. The comparatively large size of this insect, and its peculiarly formed antennae, distinguish it at a glance. On oak principally, or hawthorn blossom. N. Forest, fairly common (H.P.J.).

Byrsoptera, Spin. *B. rufifrons*, Fall. — Antennae simple, 2nd joint not shorter than 3rd; sexes very dissimilar: ♂ macropterous, elytra parallel sided; ♀ brachypterous, elytra not quite covering abdomen, at their widest point three times the width of the pronotum. Black-brown, with very fine pale hairs: ♂ with elytra brown, cuneus of last, legs, and 3rd and 4th ant. joints ochreous; ♀ with head red, legs and antennae testaceous, the antenna with 1st joint at base, and 2nd at base and apex, black. L. 4½mm. ♂: ♀ 3½mm. Very distinct from its allies, and more likely to be confused with *Mecanina* or *Halticus*. Amongst nettles, etc. S. Hants and I. of Wight, not uncommon.

[*Brachyarthrum*, Fieb. *B. limitatum*, Fieb. — Both sexes macropterous, not very dissimilar: elongate, parallel-sided; 2nd ant. joint longer than 3rd; antennae black, stout. Head black in both sexes; ♂ pronotum

brownish-black, anterior margins narrowly yellowish; elytra black-brown, base of cuneus yellowish; antennae with 1st joint brownish, otherwise black; 1st and 2nd ant. joints stout, 3rd less so, 4th slender; legs orange-yellow. ♀ with rather shorter membrane and antennae; pronotum and elytra paler, cuneus clear yellow; legs and antennae yellow as in ♂. Insect thickly covered with pale pubescence. L. 5mm. Allied to *Phylus*; according to Butler, who found the insect in some numbers on aspen, it might possibly be mistaken in the net for *Plagiognathus arbustorum*, Fab. Uncommon.]

Phylus, Hbn.—Insect elongate, parallel sided, macropterous; antennae slender, pale. With pale dense pubescence.

P. palliceps, Fieb.—With the exception of the eyes entirely pale orange-yellow, with pale yellow hairs. L. 6mm. On oak chiefly. N. Forest, often very common (H.P.J.)

P. melanocephalus, L.—Coloured like the last on upper surface, but with the head black, and 1st ant. joint dark at base; underside black. L. 6mm. On oak with *palliceps*. Common in N. Forest, etc., and occurs in the I. of Wight.

P. coryli, L.—Black, brown, reddish or greyish-brown (never yellow) legs and antennae pale ochreous; cuneus and membrane shorter. L. 5mm. Inhabits *Corylus*. Common in Hants and I. of Wight, where all the colour forms mentioned above occur. Originally described from the black-bodied form; the paler varieties may be referred to var. *arellanae*, Mey.

[*Plesiodema*, Reut. *P. pinetellum*, Zett.—Insect oval, small, 3-3½mm. Black-brown or brown, elytra paler, cuneus ochreous at base; antennae ochreous, 2nd joint as long as 3rd and 4th combined, compressed and thickened in ♂. Body with grey hairs. Chiefly on scots pine in Br., where, however, it seems confined to the north].

Division III. (*Phylaria*).—Elytra clothed with deciduous scale-like pubescence, or (in *Sthenarus rosari*) insect with vertex of head carinated; tibiae with strong black spines, arising from dark spots. Elytra shiny, although this is not always very evident through the pubescence.

Atractotomus, Fieb.—2nd ant. joint much thickened, in ♀ at least fusiform. Oval or (♂) long-oval, black-brown, tibiae paler; 3rd and 4th ant. joints ochreous, together subequal in length to 2nd. (Compare with *Heterocordylus*).

A. mali, Mey.—Larger, more convex, ♂ with 2nd ant. joint much thickened, widest across middle, and about equal in length to width of head; ♀ with vertex of head nearly twice as wide as eye. Black-brown, slightly shiny, clothed with black hairs, and very fragile whitish pubescence; 3rd and 4th ant. joints thin, ochreous; 1st and 2nd deep black with black hairs, both swollen. Corium towards outer margin, and cuneus inwardly, often dark red in ♀: tibiae pale brown or reddish. L. 4mm. Inhabits hawthorn and fruit trees—especially apples. S. Hants, locally common. I. of Wight: Newport, on hawthorn (Butler).

A. magnicornis, Fall.—With characters of last, but smaller, less convex, ♂ longer: ♂ 2nd ant. joint less thickened, parallel-sided, much longer than width of head; ♀ vertex not nearly twice the width of eye. Paler markings on elytra, when present, more brown than

red. L. ♂ $3\frac{1}{2}$ mm., ♀ $3\frac{1}{4}$ mm. ♂ liable to be confused with *Psallus obscurellus*, but has the 2nd ant. joint black instead of ochreous or brownish. On coniferous trees, such as spruce fir. Farnborough (Ferris det. H. P. J.) New Forest?

Psallus, Fieb.—2nd joint of antenna not much thickened, never fusiform, subequal to, or longer, than 3rd and 4th together. Insect oval or oblong-oval, ♂ the longer, with eyes larger, and 2nd joint of antenna thicker and often of greater length than in ♀. Chiefly red, brown, or ochreous (cuneus generally more brightly tinted, or much paler than corium). L. $2\frac{3}{4}$ - $5\frac{1}{2}$ mm. Variation in certain of the species is extreme, but I am unable to deal fully with this subject in the present paper. In the absence of striking structural differences particular attention should be paid to the colour and markings (not always easy to appreciate unless the pubescence is abraded) and a note made at the time of capture of the particular tree or shrub from which a species was obtained.

Group I.—2nd ant. joint black or partly black.

Ps. betuleti, Fall.—Larger, $5\frac{1}{2}$ mm. ♂ with 3rd and 4th ant. joints dark, 4th about half as long as 3rd; ♀ 2nd ant. joint dark, paler in middle. ♂ long-oval, brown-black, tibiae paler, cuneus and apices of femora red-brown; ♀ broader, more convex, ochreous-red with black markings, situated chiefly on the head, antennae, prothorax, and inner portion of corium (membrane dusky). Orifice to odoriferous sac white. Insect with pale easily abraded pubescence. The largest sp. of *Psallus*, and practically confined to birch. S. Hants, usually common (H.P.J.).

Ps. ambiguus, Fall.—Smaller, $4\frac{1}{2}$ mm. ♂ with 3rd and 4th ant. joints pale (yellow), 4th joint $\frac{2}{3}$ as long as 3rd; ♀ 2nd joint pale, black at apex. Orifice to od. sac black. Elytra rather less elongate, colour duller, more grey or (♀) brown. On alder, saw, apple (especially the last named) and perhaps hawthorn. N. Forest and Southampton (H.P.J.).

Group II.—2nd ant. joint pale; hind femora without dark spots.

Ps. obscurellus, Fall.—Blackish-brown in both sexes, cuneus entirely dark. Oval, small, with short black hairs and finer golden pubescence. Antennae brownish-ochreous, 1st joint dusky in ♂; ♀ with tibiae ochreous. L. 3 - $3\frac{1}{4}$ mm. Chiefly on scots pine. New Forest, common (H.P.J.). I. of Wight: Marvel Copse (Butler).

Ps. variabilis, Fall.—Not black-brown in both sexes, cuneus pale at base. Insect broader, more robust: antennae yellow, 1st joint blackish at base; tibiae pale ochreous. L. $3\frac{1}{2}$ mm. ♂ dark brown; ♀ orange-brown or red, varying to black-brown (a common form has the elytra orange-brown, and the head, pronotum, scutellum, and hind femora black). The reddish var. *simillimus*, D. & S., might possibly be mistaken for *Ps. alnicola*, but has, of course, the hind femora unspotted red. Pubescence in all examples fine, golden, more even than in the next species. On various trees and shrubs; perhaps the commonest sp. of *Psallus*. Abounds in S. Hants and I. of Wight.

[*Ps. quercus*, Kb.—Larger than the last: pubescence coarser, white, less regular. 2nd ant. joint longer. L. ♂ 5mm., ♀ $4\frac{1}{2}$ mm. More or less brownish-red, hind femora bright red. Inhabits oak; uncommon.]

Group III.—Posterior femora spotted, frequently very dark, but always with perceptibly darker spots; 2nd ant. joint pale, immaculate, or (in *vitellinus*) insect with base of hind tibiae black. Cuneus often very widely pale, in a few species entirely white. Unless otherwise mentioned in the diagnosis, insect with both dark and golden hairs, the last adpressed and easily abraded.

Ps. lepidus, Fieb.—Entirely dark brown, varying to (var. *roseus*, H.-S.=*minor*) orange-yellow; cuneus more or less red, whitish at extreme base. L. $4\frac{1}{2}$ mm., var. *roseus* 4mm. Pronotum in typical form often ochreous anteriorly, minutely freckled with dark red or brown. On ash almost exclusively. S. Hants and I. of Wight, locally common.

Ps. alnicola, D. & S.—Clear red; cuneus and femora red, the first white at extreme base (femora more or less evenly spotted with darker colour throughout, the spots not chiefly collected in a mass towards the apex as is the case in *lepidus*, and the other allied species). Pronotum with a few darker atom-like spots or granules; pubescence of elytra collected into patches. L. $3\frac{3}{4}$ mm. Inhabits alder, and to some extent willow. New Forest (H.P.J.).

Ps. fallenii, Reut. (= *roseus*, Fall., Reut.)—Larger, of a more brick-red; cuneus red, but pale also at extreme apex as well as base; femora whitish, or very pale, rather thickly freckled with black or brown, especially towards apex. Pubescence even; pronotum with darker granules (less numerous, however, than in the next species) and with the callosities dark in ♂. L. ♂ 5mm., ♀ 4mm. Confined to birch. N. Forest (H.P.J.).

[*Ps. albicinctus*, Kb. Clear orange or orange-yellow, the colour often inclining to red, especially on corium and cuneus of elytra; pronotum with a pale central line, and scutellum paler down middle and at sides; clavus paler than corium, of a greyish tint basally, freckled with red or orange; cuneus broadly white at base, narrowly at apex. Head and pronotum somewhat wider than in the allied species, and with numerous brown atom-like spots in each case. L. $3\frac{1}{4}$ mm. On oak, beech, and willow. Has only once occurred in this country, and then on willow.]

Ps. varians, H.-S.—Rather similar in certain of its forms to the rare *albicinctus*, but considerably larger, narrower in proportion, head and pronotum smooth, without darker "pimples," and clavus usually concolorous. Yellowish to orange-red, generally with the margins paler, and scutellum with a pale central line; cuneus very broadly white at base, and pale also at extreme apex. L. $4\text{--}4\frac{1}{2}$ mm. Larger than *diminutus* following: 4th ant. joint half as long as 3rd; ♂ genital segment normal. On various trees and shrubs, but especially oak, occurring from June to September. N. Forest, common: Lymington (H.P.J.).

Ps. diminutus, Kb.—Almost identical with a pale form of the last, but always smaller and, when tinged with red, more freckled; apical joint of antenna $\frac{2}{3}$ as long as 3rd; genital segment in ♂ not carinated. L. $3\frac{1}{4}$ mm. As regards size and colour approaches closely to *albicinctus*. On oak, with *variens*, but rarer or overlooked. I. of Wight: Parkhurst Forest (E. A. Butler).

Ps. roseus, F. (= *sanguineus* = *alni*).—Greyish-white, with a few pink spots on clavus and corium, or with the elytra rather densely freckled with pink or red; cuneus entirely pale; posterior femora red with a few dark spots, hind tibiae not very long. Elytra with rather irregular patches of fine pale pubescence. L. $3\frac{1}{2}$ -4mm. On willows. Common in Hants and I. of Wight.

Ps. salicellus, Mex.—Greyish, cuneus entirely white, elytra densely sprinkled with small brown spots; posterior femora brown. Longer than *roseus*, with long pale and brown hairs intermixed; hind tibiae very long and slender. L. $4\frac{1}{2}$ mm. On hazel and willow, especially the former; also, according to Morley, on birch and alder. S. Hants and I. of Wight; locally common.

[*Ps. vitellinus*, Schltz.—The smallest Br. species, $2\frac{3}{4}$ mm. Uniformly yellow or brownish-yellow, with pale yellowish pubescence when fresh; 2nd ant. joint sometimes with the base black; tibiae with the usual dark spines and spots, and black also at extreme base; femora slightly spotted. Could only be confounded with a species of *Plagiognathus*. On spruce fir; either very local or overlooked in Br.]

[*Ps. luridus*, Rent.—Almost entirely pale sordid yellow; head and eyes much larger than in our other species, and body broader; cuneus white at base and apex. Base of tibiae pale, 2nd ant. joint unspotted. With both white deciduous and rather dense dark pubescence. L. $4\frac{1}{2}$ mm. Shows little relationship with the last named, or indeed any other of the Br. species of *Psallus*; placed provisionally, O.C., with those species that have the cuneus variegated. Inhabits young larches; rare.]

Sthenarus, Fieb.—Oval or broad-oval, more convex than in *Psallus*, sexes alike in form; antennae shorter, slenderer, 2nd joint longer than 3rd and 4th together, scarcely thickened. Head and pronotum wide. L. 4mm. The two Br. species representing the genus hardly agree in more than the few characters given.

St. rotermundi, Schltz. (*Psallus*, id., Br. Cat.).—Broad-oval, clothed with dense white deciduous pubescence; vertex of head immarginate; hind femora very wide. Greyish-brown, with margins and clavus paler ♂, greyish-white, more or less spotted or suffused with grey-brown ♀; head pale, with a dark mark or two spots on vertex; femora and cuneus in all except very freshly disclosed examples red or reddish, cuneus white at base; femora and tibiae with darker spots, the last with the usual strong black spines. On poplars, *Populus alba* in particular. Southampton (H.P.J.); "Hants" (B.Br.H. H.); I. of Wight; Freshwater (Butler).

St. roseri, H.-S. (*Plagiognathus* id. Br. Cat.).—Oval, with only very fine pale decumbent hairs; head at vertex with a distinct transverse carina; hind femora not very wide. Brownish yellow, with the head darker, varying to black-brown on body, with only cuneus and extreme base of corium testaceous; femora always more or less red, tibiae with dark spots and spines. Inhabits willows. "Hants" (B.Br.H. H.).

Division IV. (*Phylarioi*).—Tibiae with black spines; elytra shiny, without pale deciduous scale-like pubescence, clad merely with fine regular hairs. Oval or long-oval, small, 2-5mm. 2nd joint of antenna shorter than 3rd and 4th together, slightly thickened in ♂; vertex of head immarginate. On or amongst low plants chiefly; certain of the species are easily overlooked.

[*Microsynamma*, Fieb. (*Plagiognathus*, subg. *Neocoris*, Br. Cat.) *M. bohemani*, Fall.—Posterior legs not saltatory; tibiae with black spots; claws shorter: sexes nearly alike in shape, oval; femora black or red, insect without silvery pubescence. L. 3-3 $\frac{1}{4}$ mm. Dark brown, vertex of head, a spot by each eye, basal angles and apex at least of scutellum, a pronotal central spot or line, and base of corium and cuneus, paler; femora red at apex. Head wide, eyes large, projecting: insect with very fine pale hairs. Var. *scotti*, Fieb. (= *nigritula*, Fall.) is entirely brown except for a pale spot by each eye, on extreme base of corium, and sometimes basal angles of scutellum. "On willows, especially *Salix repens* and *S. lapponum*, taken both by sweeping and grubbing at the roots." Local or overlooked.]

Plagiognathus, Fieb.—Hind legs not saltatory, tibiae with black spots; claws longer. ♂ longer and more parallel sided than ♀; femora pale (brown or brownish) spotted or margined with black or insect with silvery hairs. Antennae long, 2nd joint rather thick in ♂, almost equal in length to 3rd and 4th combined.

[*P. albipennis*, Fall.—Surface clothed with silvery hairs. Greyish-white, varying to brownish, head darker in front, antennae darkened at base; hind femora wide, brown, or with brown spots. ♂ may be entirely brown, with only extreme basal angles of scutellum, and base of cuneus paler. L. ♂ 4mm., ♀ 3mm. On *Artemisia*, often in gardens. As remarked by Butler, its silvery pubescence is in perfect keeping with the plant.]

P. chrysanthemi, Wlff. (= *P. viridulus*, Fall., Reut.).—Clothed with black hairs, easily abraded; femora spotted at apex, but not margined with black. Green, ochreous or greyish-green, sometimes brownish; basal joint of antenna black except at extreme apex, 2nd joint pale, black at extreme base and often at apex. L. 4-4 $\frac{1}{2}$ mm. Inhabits various low plants. S. Hants and I. of Wight, usually very common.

P. arbustorum, Wlff.—Clothed with black hairs; femora margined as well as spotted with black. 1st and 2nd ant. joints entirely black. Varies from ochreous-brown to black-brown, femora in dark forms usually paler except at sides; cuneus pale at least at base. L. 4-4 $\frac{1}{2}$ mm. In shape and colour not unlike *Psallus obscurus* or ♂ *Ps. variabilis*. Amongst nettles, etc. Abounds in Hants and I. of Wight.

Chlamydatus, Curt.—Hind legs saltatory, the femora very broad. Elytra often undeveloped, their apices rounded, reaching only to about middle of abdomen. Insect shiny, with pale pubescence. L. 1 $\frac{1}{2}$ -3mm.

[*C. pullus*, Reut. (= *Plagiognathus pulicarius*, Br. Cat.).—Tibiae with large black spots and strong spines. Entirely black except on femora, tibiae, and apical ant. joints, all of which are ochreous, the femora often only at apices. L. 2 $\frac{1}{2}$ mm. Developed form rather like *Microsynamma*, but with pronotum wider, and eyes less projecting. The true *C. pulicarius*, Fall., appears not to have been taken in Britain; it is a smaller insect (1 $\frac{2}{3}$ -2 $\frac{1}{2}$ mm.) with darker femora, the 2nd ant. joint somewhat thicker in ♂, and surface less shiny. On ground in dry sandy places at roots of plants].

C. saltitans, Fall.—Tibiae without spots, spines fine; base of elytra pale. Black or black-brown, elytra brown, paler as stated at base; antennae dark, 2nd joint thickened towards apex. Insect nearly always brachypterous in Br. L. 3mm. (macr.), 2-2 $\frac{1}{2}$ mm. (brach.). At roots of plants, usually in dry sandy situations. Morley has found it

under stones. Lymington (P. Harwood det. H.P.J.) "Hants" (B.Br.H.-H.) I. of Wight: Freshwater (Dale).

[*C. wilkinsoni*, D. & S.—Tibiae unspotted, with fine spines; base of elytra concolorous with the rest. Entirely brown, size as in *saltitans*; antenna pale, 2nd joint less thick; hind femora longer, not so wide. Usually macropterous in my experience. "Sandy ground covered with very short grass, thyme, and other plants, seems the especial haunt of the insect." It was originally taken in Br. at Scarborough amongst roots of lily of the valley.]

[*C. evanescens*, Boh.—Tibiae with fine spines, and unspotted; colour brown, base of elytra concolorous: I have not seen an example of this apparently minute insect, but it is said to be distinguished from *wilkinsoni* by its less glossy surface, coarser more conspicuous yellowish-white pubescence, and black antenna, the 2nd joint of which is thickened as in *saltitans*; from the last, in addition to the unspotted elytra, it may be known by its coarser pubescence, longer 3rd and 4th ant. joints, and less shiny surface. L. $1\frac{1}{2}$ - $1\frac{3}{4}$ mm. Once taken in Br. at Colwyn Bay amongst *Sedum*.]

Asciodema, Reut.—Hind legs not saltatory; spines of tibiae fine, not rising from black spots. Shiny, oblong-oval; ♂ more elongate and parallel sided than ♀.

A. obsoletum, D. & S.—(Greenish-grey, membrane with an angular dark line below cuneus. L. 4-5mm. Clothed with fine white hairs intermixed with darker. Inhabits gorse and broom; common in Hants and I. of Wight.

[*A. fieberi*, D. & S.—Very pale yellow, with concolorous pubescence; membrane unspotted. L. $4\frac{1}{2}$ mm. Has occurred on Wych elm and palings; probably inhabits Hants, but overlooked].

CRYPTOCERATA.

Distinguished by the apparent absence of antennae, these being concealed in foveae under the head. So far as the Br. species are concerned purely aquatic bugs, living throughout their stages in water, and hibernating therein under mud as adults; the last as a rule fully winged, but leaving the water, when the need arises, perhaps only at night. Carnivorous, predaceous, in most instances grasping their prey with their front legs, using the other pairs either for walking or swimming. In macropterous forms, which predominate, the hemielytron is of three parts, clavus, corium and membrane.

Fam. 1. **Nepidae**.—Insect with a long and filamentary breathing tube, produced from anal portion of abdomen. Macropterous: front legs of remarkable form, raptorial, inserted on anterior margin of prosternum; hind and intermediate legs ambulatory, with single jointed clawed tarsi; head not very large or wide, horizontal, acute in front, eyes prominent. Pal. 12.

Nepa, L. *N. cinerea*, L.—Flat, broad, widest behind middle of elytra; anterior coxae short, very thick, femora much widened, tibiae when folded back fitting into a groove on the anterior margin of femora. Ochreous-brown, surface very dull, abdomen above hidden, of course, except during flight) red at sides. L. 18-20mm., fil. about

11mm. The well known "water-scorpion." Inhabits the bottoms of shallow ponds, especially when these are much choked with weed, and situated in pastures. Abounds locally in Hants and I. of Wight.

Ranatra, F. *R. linearis*, L.—Very elongate, large, sub-cylindrical, pronotum constricted towards middle; legs very long, front pair much of the type found in *Nepa*, but attenuated, coxae elongate, linear, $\frac{2}{3}$ as long as femora, the last each with a short angular projection or tooth. Ochreous, surface not very dull, abdomen above orange-red. L. 32-35mm., fil. about 28mm. In ponds; local. N. Forest (W. J. Lucas and others). Probably common in the latter locality. Hayling Is. (Dale). I. of Wight; Parkhurst Forest (E. A. Butler).

Fam. 2. **Naucoridæ**.—Abdomen without anal appendix; antennæ with four joints, tarsi with two. Anterior legs inserted on or near the anterior margin of prosternum; elytra when present placed horizontally.

[*Aphelochirus*, Westw., *A. aestivalis*, F. form *montandoni*, Hrv.—Front tarsi with claws. Short, very wide, rather flat, abdomen almost circular in outline, sides of pronotum rounded; elytra undeveloped, appearing only as two transverse scales. Pronotum receiving head almost to front of eyes; head prominent, subtriangular. All legs simple, tarsi clawed. ♂ with last abdominal segment almost entirely covering genital segments. Head, legs, rostrum, and usually pronotal margins and extreme sides of abdominal segments, yellow, insect otherwise dark greyish-brown; surface dull. L. 10mm. Frequents running water rather than ponds; very local, or overlooked.]

Naucoris, Gffr. *N. cimicoides*, L.—Front tarsi without claws. Broad-oval, slightly convex, macropterous: head very wide, rounded in front, and buried in pronotum, so that the sides of the last, eyes, and front of head form a continuous curve. Front legs raptorial, short, curved, their femora extremely broad: hind and intermediate pairs natatorial, with long spines and clawed tarsi. Ochreous, head and pronotum very shiny; elytra greyish-brown, dull, very finely and closely punctured. L. 12-16mm. Inhabits weedy ponds and ditches, keeping near the surface: in general form, movements, and habits much like a water beetle. New Forest (P. Harwood and others): "Hants" (B.Br.H.-H.); I. of Wight: Parkhurst Forest (Morey); R. Yar, Brading (Butler).

Fam. 3. **Notonectidæ**.—Anterior legs inserted on the posterior margins of prosternum (the position is due to the extreme shortness inwardly of the latter); rostrum free, three-or-four-jointed; vertex of head overlapped by pronotum. Head broad, face convex, vertical; elytra declivous in repose; tarsi two-jointed, those of first and second pairs at least with claws. The insects swim inverted. Pal. 14 or 15, if the various forms given below are regarded as distinct, otherwise about 12.

Notonecta, L. ("Boatmen").—Large, oblong, convex; rostrum 4-jointed; hind legs natatorial, much longer than the others, their tibiae and tarsi (the latter especially) ciliated. Pale yellow to brownish-orange, elytra with costa at least marked with black or dark brown, dull; scutellum velvety black; head and pronotum very shiny, the last trapeziform, metallic, and darkened basally. L. 13 $\frac{1}{2}$ -16mm.

ab. *fasciata*, Splr., *Schm. Eur.* I. 227 (1906).

ORIG. DESCRIP.—“With dark grey central area.”

ab. *ochrea*, Warr. (Seitz), *Pal. Noct.* III. 95 (1910).

FIG.—*l.c.* pl. 23a.

ORIG. DESCRIP.—“Ochreous, dusted with grey, and with a slight flush, rufous in ♂, reddish brown in ♀, with the lines dark grey and the marginal area darker; the white spot at end of cell as usual; hind-wing dirty whitish in ♂, with termen greyer, more wholly grey in ♀.” Switzerland.

ab. *expallidata*, Warr. (Seitz.), *l.c.*

FIG.—*l.c.*, pl. 23e.

ORIG. DESCRIP.—“Quite small, smooth pale grey with a flesh-colored tinge; the inner line hardly traceable, but the outer black and distinct throughout; the lunules and the teeth all alike strongly marked; but the usual marginal dark area is here concolorous with rest of wing; the median vein shows dark below the white discal spot; hindwing dirty white, greyer towards termen.” Digne.

subsp. *rufotincta*, Wagn., *Verh. z.-b. Ges.* LXX.(42), (1920).

ORIG. DESCRIP.—“Distinctly brighter than *albipuncta*, more corresponding to the coloration of *conigera*, yellow to fox-red with bright rosy shimmer, which especially shows on the almost white hindwings in both sexes between the costal and inner marginal third of the area towards the base of the wing, obsolescent near the base. Underside also much brighter than *albipuncta*, the wing-margins of moderate development, but here suffused with bright rose-red. The waved line on the fore- and hindwings mostly only indicated, in many cases obsolescent. The silvery gloss somewhat more developed.” Tunis.

Leucania, Ochs. (1816) [*Sideridis*, Hb. (1822); *Spaelotis*, Blanch. (1852); *Cirphis*, Walk. (1865)] *unipuncta*, Haw.

Stephens, by a printer's error probably, called it *impunctata*. See Index, *Illus.* III.

Tutt *Ent.* XXI. 139 (1888): *Brit. Noct.* I. 34 (1891): Barrett *Lep. Br. Is.* V. 160, pl. 204 (1899): *Stdgr. Cat.* ed. III. 193 (1901): Hamps. *Lep. Ph.* V. 547 (1905): Splr. *Schm. Eur.* I. 227, pl. 29, f. 28 (1906): South *Moths Brit. I.* I. 310, pl. 149 (1907): Warr. (Seitz) *Pal. Noct.* III. 100, pl. 25e (1910): *Am. Noct.* VII. 167, pl. 24h (1925): *Ind.-Aus. Noct.* XI. 96 (1913).

Culot's figure of *unipuncta* is the best I have seen. Most figures are poor and even unrecognisable. South's is also a good figure.

Barrett says, “Hardly variable, except in the more red or brown tone of clouding in the forewings.” “Slight variations from different parts of the world have received names.” These variations have been found to be more or less prevalent geographically and therefore may be of races or even of subspecies.

Brown reports of the Dobrée collection an aberration, “Forewings strongly tinged with red,” from Canada, West.

And another from S. Australia, "Small (39mm. as against 43mm.); greyer and more coarsely powdered with black atoms than the specimens from Canada; the white spot in the reniform stigma hardly visible; basal area of hindwings whiter."

Guenée says "Varies in size, but always larger than *lithargyria*."

Warr. (Seitz) in *Pal. Lep.* takes no notice of the geographical variation, nor of the aberration.

The forms to be considered are:—

unipuncta, Haw., *Lep. Brit.* 174 (1909) (3 ? 6 ?).

subsp. *extranea*, Gn., *Noct. Hist. Nat.* V. 77 (1852).

race *antica*, Walk., *Cat. Het.* IX. 100 (1852).

race *punctulata*, Blanch., *Gay's Chili.* VII. 74 (1852).

r. *luteomaculata*, Brem. and Gry., *Beitr. Schm. Fn. Nord. China.* 1858.

race *convecta*, Walk., *Cat. Het.* XI. 711 (1857).

race *separata*, Walk., *l.c.* XXXII. 626 (1865).

race *adusta*, Moore, *Pr. Zool. S.* 335 (1881).

race *consimilis*, Moore, *l.c.* 336, plt. 37, fig. 19 (1881).

race *trifolii*, Btlr., *Trans. Ent. S. Lond.* 114 (1882).

race *saccharivora*, Btlr., *l.c.* 115 (1882).

ab. *asticta* (Gn.), Tutt, *Ent.* XXI. 139 (1888).

race *adultera*, Schaus., *Trs. Am. Ent. S.* XXI. 232 (1894).

Butler says (1882) that "*saccharivora* has the general aspect of *L. lithargyria*."

Tutt deals with *unipuncta*, Haw., the darker *extranea*, Gn., the very pale form *antica* from South America and Darjeeling, the uniformly greyish form *convecta* from Australia, the *separata*, a faded, washed-out form from China, Japan, etc., the grey well-marked form from S. America, *trifolii*, the small bright reddish form *saccharivora* from India, China and New Zealand, and the *asticta*, with no white spot, "var. A" of Guenée.

Butler, *Trans. Ent. S. Lond.* 661 (1890), refers the Indian *adusta* of Moore, *P.Z.S.* 335 (1881), to the *antica* of Walker, *Lep. Het.* IX. 100 (1852), from the W. coast of S. America. Most entomologists will no doubt treat these two as two races if not actually subspecies of *unipuncta*.

race *punctulata*, Blanch., *Gay's Chili.* VII. 74 (1852).

FIG.—Seitz. VII. plt. 24h.

ORIG. DESCRIPT.—"Pallida cinerascens; alis anticis angustiusculis, pallide fulvescentibus, punctis fuscis irregularibus, adpersis, maculis ordinariis pallidis, haud punctatis; posticis cinereis. 18 lin."

Warr. (Seitz) *Fn. Am. Noct.* VII. 167 (1925) says "Is of a greyer or ochreous-yellowish tinge and much more coarsely strewn, with a stronger apical stripe and very distinctly contrasting maculae in a darkened cell." Plt. 24h. Chili.

Hamp. *Cat. Lep. Ph.* V. 548 (1905). "More grey brown; the striation of the forewing much more prominent, and the stigmata more distinct."

race *luteomaculata*, Brem. and Gry., *Beitr. Schen. Fn. Nord. China* (1853).

ORIG. DESCRIP.—“*Alis anticis luteo-obsoleto cinereoque maculis duabus rotundatis luteis cinereo-pupillatis; ante marginem externum series punctorum nigrorum:—posticis cinereis.*”

The forewings are ashy-grey and yellowish clouded. In the position of the usual stigmata there are two round yellowish spots with small grey pupils. Towards the apex of the wings there runs from the costa to the hind margin a row of dots curved outwardly. The hindwings are uniformly grey, darker towards the outer margin.

race *adusta*, Moore, *Pr. Zool. S.* 335 (1881).

ORIG. DESCRIP.—“Forewing ochreous-yellow; median and submedian veins white; borders of the veins and a line between each vein ochreous brown; costal border and an oblique apical streak ochreous-brown; a few black speckles disposed on the costa, also within and below the cell; a discal series of black speckled spots, one on each vein, and a marginal row of spots; cilia brown; hindwings ochreous white, external area pale cupreous brown; marginal spots black; cilia white. Underside ochreous white, suffused with pink externally; both wings speckled with brown on anterior and exterior borders, and with a marginal row of black spots; forewings with a small black costal spot before the apex.” Darjiling, Khasia Hills.

ab. *consimilis*, Moore, *Pr. Zool. S.* 336 (1881).

FIG.—*l.c.*, pl. 37, f. 19.

ORIG. DESCRIP.—“Near to *L. decisissima*, but differs in being larger, paler, and more uniformly coloured. Forewing with paler linear markings between the veins, the white portion of the discoidal streak half its length and less distinct, the transverse discal spots and the subbasal series more loosely speckled, the marginal series less distinct, the basal two-thirds of the wing also sparsely sprinkled with black speckles; hindwing paler brown and whitish at the base. Underside of both wings ochreous white, with an indistinct transverse discal line. Thorax, head, and palpi brown speckled; legs with pale brown streaks.” $1\frac{7}{12}$ inch. Darjiling.

Elwes, MS. note in his copy of Swinhoe's *Cat. Moths of Ind.* 262, says “a doubtful species like to *decisissima* but the silver mostly obsolete and streak faint.”

race *adultera*, Schaus. *Trans. Am. Ent. Soc.* XXI. 232 (1894).

ORIG. DESCRIP.—“Body greyish fawn colour, the abdomen a little paler than the thorax. Primaries above greyish fawn colour, the veins flecked with black; a subapical dark shade; the median vein shaded with grey; a pure white spot at the origins of veins 3, 4, 5. Secondaries whitish with the veins and the outer margin broadly brownish grey; the fringes whitish. Underneath: primaries greyish, with a dark spot and broad outer shade; secondaries white, with the costal and outer margins broadly grey.” 35mm. Castro, Parana.

Draudt in Seitz, VII. *Am. Noct.* treats it as *unipuncta* (typical).

Leucania, Ochs. (1816-25): [*Mythimna*, Ochs. (1816-25): *Hyphilare*, Hb. (1822): *Sideridis*, Hb. (1822): *Aletia*, Hb. (1822)] *lithargyria*, Esp.

Treit. altered the spelling to *lithargyrea*; this is followed by Hübner, Herrich-Schäff. and Meyrick in both editions.

In the *Nachtr.* to Schiff. *Verz.* p. 313, a species named *decora* is added next to *albipuncta* in Section Q, p. 85. Ernst and Engram., *Pap. d'Eur.* VII. 130 (1790) suggest that *decora* of Schiff. is *lithargyria*. Bork. *Eur. Schm.* IV. 701, describes *decora* in words which apply equally to *lithargyria* except that the light base of the reniform was not mentioned. He places it next but one to *albipuncta*, Hb., and other authors figure a species *decora*, which is an Agrotid, and could not be confused with a Leucaniid like *albipuncta*, etc., by such a skilled observer as Schiff. It would appear that the name *decora* is prior to *lithargyria*. Illiger, *Verz. ausg.* I. 290 (1801) confirms the position of *decora* next to *albipuncta*.

In early times *lithargyria* and *albipuncta* were confused and Guenée, *Noct.* V. 75, says that even Duponchel's descriptions applied equally to both species and that both his figures seem to represent *lithargyria*. De Villers in 1789 clearly differentiated the species, he calls one *albipuncta*, *Ent. Sys.* I. IV. 488, and the other *punctum-album*, II. 282. *Lithargyria* never has a white front edge to the costa of the forewings as does *albipuncta*.

In the opinion of Guenée, *Noct.* V. 75 (1852), the *albipuncta* of View., *Tab. Verz.* II. 59, plt. III. 3, and of Dup., *Hist. Nat.* VI. plt. LXXX. 1, the *ferrago* of Fab., *Ent. Sys.* III. 2, 76 (1794), the *ferruginea* of Bork., *Scriba Beitr.* II. 149, plt. X., 5, the *grisea* (?) of Fab., *l.c.* 69, of Haw., *Lep. Brit.* 209, and of Steph., *Ill.* III. 150, and the *anargyria* of Dup., *l.c. Sup.* III. 484, plt. 41, are all *lithargyria*, Esp. He further says that the last is only the female and not a variety, and that the English form is a pale variety, which has been called *grisea* (Haw., Steph.).

Werneberg remarks, *Beitr.* II. 258, that the figure in Scriba's *Beitr.* II. 149, is poor. The white discal spot referred to in the description is wanting. He says *ferruginea*, Bork., is *ferrago*, Fab., *i.e.*, *lithargyrea*, Tr.

H.S. says *ferruginea*, Bork., is synonymous with *lithargyrea*, *Sys. Beau.* II. 238.

Bork. (Scriba) says that his *ferruginea* is the *ferruginea*, Schiff. *Verz.* 86 (S. 7) 1775.

Borkhausen himself (Scriba *l.c.*) says his *ferruginea* has much similarity with the *albipuncta* of Vienna, but he cannot decide as to whether the *ferruginea* of Schiff. *Verz.* 86, be the same species.

Tutt *Ent.* XXI. 136 (1888): *Brit. Noct.* I. 31 (1891): Barr. *Lep. Br.* I. V. 175, plt. 205, 3 (1899): Stdgr. *Hled.* 193 (1901): Hamp. *Lep. Phal.* V. 437, fig. 120 (1905): Splr. *Schm. Eur.* I. 227, plt. XIII. 25 (1906): South *Moths Br.* I. I. 312, plt. 150 (1907): Warr.-Seitz. *Pal. Noct.* III. 95, plt. 23c (1910).

Esper's fig. 5 on plate 124. ♂ is unrecognisable. It is credited with representing *albipuncta*.

Rambur's figure, in my copy, is too yellow, prob. deteriorated, plt. VIII. 2, no letterpress.

Esper in 1788, refers to Lang's *Verz.* 1789, and Lang vice-versa.

All four of Ernst. and Engr. figs. 499 have wide dark marginal

area to the hindwings. The two male undersides are strong silvery, hence their name "l'argentée."

Duponchel's fig. of *lithargyria*, VII., plt. CVII. 1, is a very red form with clouds of deeper red around the discoidal, and has a darker outer marginal area.

In the variation Barrett *l.c.* V. calls attention to a narrow black clouding along the median nervure, and across the reniform stigma, which not infrequently occurs in all shades of colour.

Browne reports a form in the Dobrée collection from Beverley, "A distinct dark shade along the hind margin." f.w. (?).

The names and forms to be dealt with are:—

[*decora*, Schiff., *Verz. Nacht.* 313 (1775)].

lithargyria, Esp., *Schm. Abb.* IV. 341, plt. 124, f. 6 (1788).

punctum-album, de Vill., *Lin. Sys. N.* II. 282 (1789).

ferruginea, Bork., *Scriba Beitr.* II. 149, plt. X. 5 (1791).

race *ferrago*, Fab., *Ent. Sys. &c.* III(2). 76 (1794).

unipuncta, Haw., *Prod.* 15 (1802).

race *grisea*, Haw., *Lep. Brit.* 229 (1809).

lithargyrea, Tr., *Schm.* V(2). 183 (1825).

ab. *anargyria*, Bdv., *Ind. Meth.* 132, ♀ (1840).

sub-sp. *argyritis*, Rmbr., *Cat. And.* plt. VIII. 2 (1858).

ab. *extralineae*, Tutt, *Ent.* XXI. 136 (1888) : *B.N.* 32 (1891).

ab. *pallida*, Tutt, *B.N.* 32 (1891).

ab. *flavescens*, Tutt, *l.c.*

ab. *marginata*, Tutt, *l.c.*

ab. *amata*, Strand., *Schrift. gess. Dantz. N.F.* X. 285 (1910).

ab. *demaculata*, Hoffm. and Kloss., *Schm. Stierm.* II. Mitt. Nat.

Ver. Stierm. LII. 113 (1916).

ab. *meridionalis*, Dannh., *Ent. Zeit.* XXXIX. 172 (1926).

ab. *deinographa*, Dannh., *l.c.*

ab. *myopolia*, Dannh., *l.c.*

Tutt deals with (1) the type; (2) r. *grisea* the grey form; (3) the Spanish *argyritis*, (4) the common reddish *ferrago*; (5) *extralineae* with a complete transverse line through the lunular; (6) the fulvous *flavescens* and (7) dark margined on the hind-wing, *marginata*.

ab. *grisea*, Haw., *Lep. Brit.* 229 (1809.)

FIG.—Wood. *Ind. Ent.*, fig. 189.

ORIG. DESCRIP.—"Thorax maris griseus, feminae rufus, abdomine pallido. Alae fere unicolores. Stigma anticum nullum, et tantum punctum album parvum loco basis stigmati postici. Posticae alae fuscae ciliis rufis."

"Alis maris griseis, foeminae rufis, puncto medio albo, strigaeque arcuata postica punctorum minutissimorum fuscorum."

Hampson, *l.c.*, calls it an ab. "Thorax and forewings greyish and only slightly tinged with red; hindwing paler."

Warr.-Seitz treats it as an aberration of *lithargyria*; Tutt says it is the male corresponding to Fabricius' description of the female, (*ferrago*) the red form.

ab. *anargyria*, Bdv., *Ind. Meth.* 132 (1840).

FIG.—Dup. *Hist. Nat.* sup. III. pl. 41.

ORIG. DESCIP.—“Differs from typical *lithargyria*, by the wings being less micaceous below and by the absence of the black pencil of hairs at the base of the abdomen of the males.”

Warr.-Seitz considers this as synonymous with *lithargyria*.

Duponchel adds to the description that “it is less silvery below than *lithargyria*.”

sub-sp. *argyritis* Ramb., *Cat. Andal.*, pl. VIII. 2 (1858).

NOTE:—Warr.-Seitz, *l.c.* III. 95., treat *argyritis* as a good species.

Dannehl says, *Ent. Zeit.* XXXIX, 172, that he cannot consider this as a good species. “In the South Tyrol very many grey examples were met with, *grisea*, Haw., which in the extreme forms go into dull white grey and on the hindwings bear the row of dots which is characteristic of *argyritis*, Rmbr. These South Tyrol examples undoubtedly belong to *lithargyria* since they form an unbroken series of transitions.”

ab. *demaculata*, Hoff. and Kloss., *Stierm. Schm.* II. 113 (1916).

ORIG. DESCIP.—“Three examples in my collection have the white discal spot either not present or only very obsolescent. The forewings are thus unicolorous. I call this form *demaculata*. It has only occurred in the red-brown form.”

ab. *amata*, Strand., *Schrft. Ges. Danz. N.F.* X. 285 (1910).

ORIG. DESCIP.—“The forewings unicolorous redbrown without any other markings than the white discoidal spot. The hindwings blackish grey.” In Oevrebo in Southern Norway.

ab. *meridionalis*, Dannh., *Ent. Zeit.* XXXIX. 172 (1926).

ORIG. DESCIP.—“They are recognised, by the hindwings showing a row of fine dots, as belonging to Warren's *argyritis* and on the other hand by the more considerable size, on the average, than that of the typical form and var. *argyritis*.” S. Tyrol.

ab. *deinographa*, Dannh., *Ent. Zeit.* XXXIX. 172 (1926).

ORIG. DESCIP.—“Grey-toned examples particularly characterised by saturation with dark tone atoms and traces of markings, so that the lines become well emphasised.” S. Tyrol.

ab. *myopolia*, Dannh., *Ent. Zeit.* XXXIX. 172 (1926).

ORIG. DESCIP.—“They are quite uniformly suffused with dark powdering mostly on a grey, more rarely on a grey-yellowish, or grey reddish ground, in which no trace or relic of lines are apparent. These uniformly smoky grey or brownish insects I call *myopolia*.” S. Tyrol.

Leucania, Ochs, (1816). [*Aletia*, Hb. (1822): *Mythimna*, Tr. (1825); *Eriopyga*, Gn. (1852): *Hyperiodes*, Warr.-Seitz. (1910).] *turca*, L.

The description given by Tutt as the original one, Linn. *Sys. Nat.*

edXII. 847 (1767), is not so. The species was first described in *Fn. Suec.* edII. 1221 (1761) as follows:—

“Alae superiores cinereo-rufae l. vinacei coloris strigis duabus remotissimis, in medio lunula minuta alba, absque ullis maculis ordinariis. Subtus alae omnes purpurascens striga fusca.” Fabricius adds to the description “Margo alarum purpureus.” *Ent. Sys. auct.* III. (2). 113.

Hufnagel, *Berl. Mag.* III. 304 (1766). described a species *volupia* as follows, “Dull red with a white spot and two grey transverse lines on the forewings.” This, Rottemberg pointed out, is the *turca*, L.; *Naturf.* IX. 123 (1776).

Tutt, *Ent.* XXI. 136 (1888): *Brit. Noct.* I. 33 (1891): Barrett *Lep. Br. Is.* V. 178 (1899): *Stdgr. Cat.* edIII. 193 (1901): *Hamps. Lep. Phal.* V. 307 (1905): *Spuler. Schm. Eur.* I. 227 (1906): *South Motis Br. I.* I. 314 (1907): *Warr.-Seitz. Pal. Noct.* III. 94 (1910).

Duponchel's figure, *Hist. Nat.* VII. 56, plt. 104 (1827) is much too purple although many specimens shew very rosy if looked at sideways in a good light.

In Hubner's figure 218 the flecks scattered over the forewings are too large for the average example.

Ernst's fig. 497a, *Pap. d'Eur.* VII. probably represents Tutt's *obscura*.

Of the variation Barrett says *l.c.*, 179.

“Not very variable, except that in certain localities—as in Essex—the ground colour is often paler, sometimes becoming drab, but with a dusting of the usual red tint.”

The figure which Barrett gives on his plate 206, vol V. of the Essex form scarcely expresses this “drab” colour and is hardly paler than the other example figured on the same plate.

It is to be noticed that the two transverse lines vary; some examples have a considerable sinus in the lower portion of the outer line bending outwards, and the basal line may approach the costa almost direct, but more often by a curve or even by an obtuse angle with convexity outwards. This is irrespective of sex, although Esper and others suggested it was a sexual difference.

The lower wings have a suppressed rose flush, which in some examples is much emphasised on a considerable portion of the inner marginal area of the hindwings from base to the outer margin. The fringes are always rosy in varying degrees in different specimens. I have never seen any specimens as rosy as the figure 218 of IIb. especially the hindwings, a defect which H. S. notes, *Bearb.* IV. 239.

Esper notes that Linn. says “cinereo-rufae” = ashy-grey with red-brown suffusion, that Fabricius says “flavescentibus” = yellowish, and that the author in *Schrift. Drontheim Gesell.* says “atro-purpureis” = black-red.

The forms to be considered are:—

turca, L., *Fn. Suec.* edII., no. 1221 (1761).

volupia, Hufn., *Berlin Mag.* III. 304 (1766).

ab. lunula, *Schrift. Drontheim. Gesells.* IV. 282 (1768)?

sub-sp. *grandis*, Btlr., *Ann. Mag. N.H.* V(1). 79 (1878). Warr.-Seitz., plt. 23a.

r. limbata, Btlr., *Tr. Ent. Soc. Lond.* 173 (1881): Warr.-Seitz., plt. 23a.

ab. *lutescens*, Tutt, *Ent.* XXI. 136 (1888).

ab. *obscura*, Tutt, *l.c.*

ab. *lividus*, Tutt, *Brit. Noct.* 33 (1891).

r. turcella, Stdgr., *Iris.* 338 (1897).

r. athesiensis, Danhl., *Ent. Zt.* XXXIX. 176 (1926).

r. virgata, Danhl., *l.c.*

Tutt dealt with the Siberian *grandis*, Butlr., the yellowish form ab. *lutescens*, the smoky-grey ab. *obscura*, and the very ab. *lividus*. He expressed a doubt (B.N., IV. 94), as to *grandis* being a *turca* form although he could not differentiate it satisfactorily to himself. Warr.-Seitz makes it a species, but says "perhaps only a form of *turca*" (*Pal. Noct.* III. 94), and redescribes it.

"Forewing browner, less red than in *turca*," outer line not so near termen; basal and marginal areas often paler than median; the dark cloud around the reniform larger; underside in particular less red; a large diffuse blackish shade over the 3 median nervules." III. 94.

Like many "far eastern" things *grandis* appears to be a large *turca*.

ab. *lunula*, *Schrift. Drontheim Gesells.* IV. 282 (1768) ?

FIG.—*l.c.* plt. 16. f. 5.

ORIG. DESCIP.—"Spirilinguis cristata, alis deflexis, atro purpureis, nebulosis, lineola arcuata flava." Trondjhem, Norway.

r. limbata, Btlr., *Trans. Ent. Soc. Lond.* 173 (1881).

FIG.—Warr.-Seitz., plt. 23a.

ORIG. DESCIP.—"Nearly allied to *M. turca* of Europe, but the primaries paler, of a more clay-coloured tint, especially on the basal and external areas, which are less striated with darker lines than in *M. turca*; secondaries paler greyer with a broad, external, creamy, buff-coloured, diffused border along the external margin; wings below with the reddish suffusion less intense towards the costal margins, and not extending to the base; expanse of wings 2 inches." Tokei, Japan.

r. turcella, Stdgr., *Iris.* X. 338 (1897).

ORIG. DESCIP.—"The seven specimens sent from the Apfelgebirges, 36-40mm. in expanse, are smaller than typical *turca*. The dark transverse lines of the forewings shew more feebly, the outer transverse line of the forewing in the ♀ is not recognisable; the very obsolescent transverse line of the underside is mostly quite absent on the hindwing. The hindwings are lighter, far less brown red suffused (not in the ♂) on the upperside they are not blackish."

Hampson describes it simply as "Smaller and paler." *Lep. Ph.* V. 307.

race *athesiensis*, Dannh., *Ent. Zt.* XXXIX. 176 (1926).

ORIG. DESCIP.—"A much darkened form, in which the lines are obscured, and on the unicolorous, blackish blue, begrimed red grey

brown only the small spots or dots of the stigmata appear pale. The hindwings are strongly dusted grey-brown, so that, except the wing margin and the suggestion at the base, there is none of the yellow-brown tone."

race *virgata*, Dann., *l.c.*

ORIG. DESCRIP.—"Only the middle area becomes darkened, base and outer areas remain of the colour of the typical forms. Thus the black grey lines stand out as a bordering of the wide middle area."

Brown reports in the Dobrée collection a form from Amurland, "Ground colour dull brown, but without the central dark shade of var. *grandis*." And also another from Mongolia, "All the region from base to second line tinged with greyish ochreous; lines very distinct; the second line waved in large crescents with points towards the hind margin."

ab. *immaculata*, Whtmn. (1929).

The following notes on *L. turca* have been received from Mr. A. J. Wightman of Pulborough, Sussex.

"Among the specimens bred three shades of true ground colour are easily recognisable: 1, pale fawn with slight pink tinge; 2, yellow ochre; and 3, pink. These ground colours are thickly dusted and spotted with dark shades of pale brown, deep brown and red. In some specimens the inner and outer lines and an irregular patch representing the reniform stand out sharply in dark brown almost black. In others these lines and patches are almost lost in the general colour of the wing. Specimens in which the central area is darker than the inner and outer areas are in about the same proportion as those which show no such difference.

"The most remarkable form bred is one in which the dark scales are entirely absent.

"Ground colour of anterior wings deep yellow-ochre, smooth and unicolorous without the least trace of darker scales, the only markings being the inner and outer lines, which are present as thin sharp almost black lines, and a small black transverse line, about 4mm. in length, representing the reniform. This line is edged toward the outer margin with white. A row of small black dots lie along the outer margin. The fringe is darker than ground colour with reddish tinge.

"Posterior wings blackish-grey edged with pink fringe.

"I do not find that this striking form has been previously noted and as it is a form certain to be recurrent I name it *immaculata*. S.E. Hants."

Leucama, Ochs. (1816) [*Hyphilare*, Hb. (1922): *Cirphis*, Wlk. (1865): *loreyi* Dup.

Tutt *Brit. Noct.* I. 35 (1891): IV. 94 (1893): Barrett *Lep. Br. Is.* V. 158, pl. 204 (1899): Stdgr. *Cat.* edIII. 193 (1901): Hamps. *Lep. Ph.* V. 492 (1905): Splr. *Sehm. Eur.* I. 226, pl. 48, f. 20 (1906): South *Moths. Br. Is.* I. 311, pl. 149 (1907): Warr. (Seitz.) *Pal. Noct.* III. 96, pl. 25e (1910): Culot *Noct. et. G.* I(2). 38, pl. 44, f. 12 (1913).

This species is merely a stray visitor to this country of which

only a few British caught examples exist. Those found in our collections are either acknowledged "foreign" exponents, "said to be British," or the "hand me downs" often from Stevens sale rooms. Thus it is hardly worth while to go into its variation further than Tutt did in *Brit. Noct.*, I. 33 and IV. 94.

Leucania, Ochs. (1816) [*Sideritis*, Hb. (1822): *Cirphis*, Wlk. (1865)] *unipuncta*, Haw. (*extranea*, Gn.).

Tutt *Ent.* XXI. 139 (1888): *Brit. Noct.* I. 33 (1891), IV. 94 (1893): Barrett *Lep. Br. Is.* V. 160, (1899): *Stdgr. Cat.* edIII. 193 (1901): Hamps. *Lep. Ph.* V. 547 (1905): *Splr. Schm. Eur.* I. 227, plt. 29, fig. 28 (1906); South *Moths. Br. Is.* I. 310, plt. 149 (1907): Warr. (Seitz.) *Pal. Noct.* III. 100, plt. 25e (1910): *Culot Noct. et. G.* I(2). 39, plt. 44, f. 15 (1913).

The remarks on the previous species might almost have been repeated, for in the 28 years of the present century about 16 specimens have been reported, but 16 of the years were blanks. The present year, however, brings a report of no less than 58 examples being taken in one locality in Ireland. This would suggest a brood. All other captures previously have been single.

This cosmopolitan species, of an almost invariable facies whatever part of the world it occurs, has been blessed with a long series of names of which, according to Hampson and Seitz, all but two must be considered as synonyms.

ab. *saccharivora*, from Chile is described by Hampson as "much redder."

ab. *punctulata*, also from Chile is said to be "more grey-brown; the striation of the forewing much more prominent and the stigmata more distinct."

For those who wish to re-investigate the status of these names the references are as follows:—

punctulata, Blanch., *Gay's Chile*, Ins. VII. 74 (1852). Chile.

extranea, Guen., *Noct.* V. 77 (1852).

antica, Wlkr., *Cat. B.M.* IX. 100 (1856). Venezuela.

convecta, Wlkr., *l.c.* XI. 711 (1857). N.S. Wales.

luteomaculata, Brem. and Grey.

separata, Wlkr., *l.c.*, Wlkr. XXXII. 626 (1865). N. China.

consimilis, Moore, *Proc. Zool. S.* (1881) 336. India.

trifolii, Btlr., *Trans. Ent. S.* (1882), 114. Chile.

saccharivora, Btlr., *l.c.* 115. Chile.

♀ *adultera*, Schaus., *Trans. Am. Ent. S.* XXI. 232 (1894). S. Paulo, Brazil.

Leucania, Ochs. (1816) [*Sideridis*, Hb. (1822)] *pudorina*, Schiff. (1775) = *impudens*, Hb.-Gey. (1827).

Tutt gave the first figure of Hübner, 229, as the type, with his, Hübner's, name *impudens*. Hübner's figure of *pudorina* came later on. 401. These, however, were not the original references. Schiff. and Den., *Verz. Wien.* 85. (1775), indicated a Noctuid as "whitish red-suffused" with the name *pudorina*.

The original extended description was by Bork. *Schm. v. Eur.* IV. 720 (1792).

"Size and figure of *Noctua comma*. The forewings are dull white and have suffused reddish longitudinal streaks; but they are without all marking. The hindwings are unicolorous dull white. Beneath all the wings are dull white. But the forewings on this side have a certain amount of red in streaks, but only extremely pale, and in the middle there shows a pale round white spot. The whole body is dull white and only the antennae are brownish on the inner-side."

This was confirmed by Illiger, *N. ausg. Verz. Wien*. I. 291 (1801).

It is remarkable how errors are copied. Even Staudinger, Culot, Meyrick, Barrett, Tutt, attribute *pudorina* to Hübner. Had they rejected Schiff. as being only an indication with no adequate description, there was a detailed description in Borkhausen before Hübner's figure, which also had no description.

Tutt *Ent.* XXI. 153 (1888): *Brit. Noct.* I. 35 (1891): Barrett *Lep. Brit. Is.* V. 134, pl. 201 (1899): *Stdgr. Cat.* edIII. 191 (1901): *Hamps. Lep. Ph.* V. 600 (1905): *Spuler Schm. Eur.* I. 222, pl. 42 (1906): *South Moths. Br. Is.* I. 307, pl. 147 (1907): Warren-Seitz. *Pal. Noct.* III. 101, pl. 25i (1910): Culot *N. and G.* I(2). 28, pl. 43, f. 3 (1913).

Duponchel's figure pl. 105, f. 4, is too dark a shade and no flush of rose on either disc or fringes.

Freyer's figure, *Neu Beitr.* VI. pl. 585 is much too dark.

Culot's figure is excellent. *N. and G.* I(2). pl. 43, f. 3 (1913).

There is a doubtful figure in Ernst and Engr., *Pap. d'Eur.* VI. pl. 237 no. 346, which has been referred to as *pudorina*. See Bork. *Schm. v. Eur.* IV. 720. Werneberg, *Beitr. z. Schm.* II. 111, determines it as *musculosa*, Hb., but the shape of wing seems more like *pudorina* although small. Treitschke refers to a different plate of the *Pap. d'Eur.*, viz., VII. p. 141, pl. 298, f. 505, which the authors had described as *pallens*. There are seven figures and of these a, b, c, may represent *pudorina* with some certainty, while d, e, f, g, are probably figures of *pallens*, Werneberg is undecided as to the identifications; there may be two species p. 121. Duponchel *Hist. Nat.* VII. 75 agrees with Treits. as to Ernst's figs. a, b, c, *pudorina*.

Hübner's figures:—

229 ♂ very large; very dark hindwings especially outer marginal half, veins indicated with lighter shade, *impudens*.

401 ♂ large but not so large; veins only lightly indicated with dark, *pudorina*.

495 ♀ not too large; hindwings darker than 401, not so dark as 229, interneural spaces light, veins broadly grey, opposite to 229, *pudorina*.

H.-S. says "all Hübner's figures are bad." That is so.

H.-S. 329-331, dark ♂ lighter ♀ good figs.

Browne reports an aberration in the Dobrée collection in which. "The body, wings and fringes are strongly tinged with pink." Askham Bog, Yorks.

Another in which the "Ground colour of the wings is pale grey, without reddish tinge."

Another from Germany of, "Pale greyish-ochreous, conspicuously paler than all the others but one."

Barrett says *l.c.* "Variation is not very great, and is mainly confined to deepening or to obliteration of the stripes of dark atoms which edge the nervures; in some specimens these are pale and obscure, in others that along the median nervure almost forms a black longitudinal dividing line, and in some of these the edging of the subdorsal nervure is also very dark."

The forms to be considered are:—

pudorina, Schiff. *Verz.* 85 (1775).

race *impudens*, Hb.—Gey. *Saml.* 229 (1827).

ab. *rufescens*, Tutt. *Ent.* XXI. 153 (1888): *Brit. Noct.* I. 35. (1891).

ab. *striata*, Tutt. *Brit. Noct.* I. 35 (1891).

race *obscurata*, Stdgr. *Rom. Mem.* VI. 474 (1892).

ab. *pallida* [Stdgr. *Cat.* edIII. 191 (1901)], *Splr. Schm. Eur.* I. 222 (1906).

race *pinguis*, Dannhl, *Ent. Zt.* XXXIX. 168 (1926).

Guenée. *Noct.* V. 86, treated *pudorina* and *impudens* as two species with the suggestion that the latter was a variety of the former. Tutt has treated it as such.

The typical form is therefore *pudorina* the English form, Hübner's fig. 401, while *impudens* is the very grey form of Hübner's fig. 229, and very rare in Britain.

Tutt deals with the ordinary British form *pudorina*, the grey continental form *impudens*, the reddish ab. *rufescens*, and the form with accentuated atoms along the nervures ab. *striata*.

race *obscurata*, Stdgr. *Rom. Mem.* VI. 474 (1892).

ORIG. DESCRIP.—"My Amur specimens all have a reddish grey coloration of forewings, which are darkened by numerous scalings more or less streak-like arranged. This occurs only rarely and only to a much less extent in European examples. Also the hindwings generally are far darker, blackish grey with light reddish fringes." Vladivostock.

Browne, in *Cat. Dobrée. Colln.*, 17, states that *obscurata*, Stdgr. = *striata* (Dobrée) Tutt. which he says is, "Glossy, wainscoat brown, coarsely powdered with dark grey; conspicuously dark grey shading between the nervures."

ab. *pallida*, *Splr. Schm. Eur.* I. 222 (1906).

ORIG. DESCRIP.—"Pale greyish ochre-yellow specimens with indistinct grey streaks."

Stdgr. *Cat.* edIII. 1901. *Splr.* was the first to describe. Stdgr. indicated Hübner's fig. 229 (329 error) as "*ab. pallida* (certo)." p. 191.

race *pinguis*, Dannhl. *Ent. Zeit.* XXXIX. 168 (1926).

ORIG. DESCRIP.—"This Tyrolean race measures quite a third more in expanse than typical *impudens*. These are thickly covered with dark brown-grey atoms so that the very dark red does not come into view." S. Tyrol.

He also adds:—"The red forms (*rufescens*, Tutt) are here thickly overlaid with dark grey-brown atoms, so that the dark red appearance does not show prominently. It might be confused with one of the

previously named forms, as with *obscurata*, Stdgr., but this latter one wants the suppressed deep red coloration."

Leucania, Ochs (1816) [*Sideridis*, Hb. (1822) : *Cirphis*, Wlk. (1865)] *putrescens*, Hb.

Tutt *Brit. Noct.* I. 36 (1896) : Barrett *Lep. Br. Is.* V. 134. plt. 201 (1899) : Stdgr. *Cat.* edIII. 192 (1901) : Hamps. *Lep. Phal.* V. 540 (1905) : Splr. *Schn. Eur.* I. 225. plt. 43. f. 11 (1906) : South *Moths Br. Is.* I. 310. plt. 147 (1907) : Warr-Seitz. *Pal. Noct.* III. 99. plt. 25 d. (1910) : Culot. *N. et. G.* I (2). 36. plt. 44. f. 3 (1913).

Tutt practically passes over this species. He refers only to Hübner's figures and to Guenée's remarks.

There is a very beautiful coloured figure of this species from an early Torquay example in Stainton's *Annual*, 1862.

All the figures in Continental works except Culot shew darker insects than any British form.

The forms to be considered are:—

putrescens, Hb.-Gey. *Saml. Noct.* 730 (1826).

race *boisduvalii*, Dup. *Hist. Nat.* VII. 79. plt. 105. f. 6 (1827).

race *canariensis*, Rebel. *Ann. N. H. Hoff. Mus.* IX. 58 (1894) : *l.c.* XXIV. 335 (1910).

Tutt referred to the species only.

Barrett says of the variation "Hardly variable except that the stripe through the middle of the wings ranges from black-brown to pale umbreous."

race *boisduvalii*, Dup. *Hist. Nat.* VII. 79 (1827).

FIG.—*l.c.* plt. 105, f. 6.

ORIG. DESCRIP.—"It has the size and form of *obsOLEta*. Its forewings are of a yellowish-grey above with their disc and their margins shaded with blackish brown, and their nervures white. Each with a white dot in the middle and two bowed transverse lines of black dots, one across the disc and the other in the marginal area. One notices also a black line, which starts from the base, and of which the length equals the width of the thorax. Finally the fringe is blackish and crossed by the yellowish lines which are the prolongations of the nervures. The underside of the forewings is of a clear grey, finely sown with black on the costa and suffused with brown in the marginal area. The hind-wings, are white both above and below, with a pearly reflection and their disc marked by black dots. They have also blackish nervures, but only above, their costal margin below finely sprinkled with brown. The head and thorax are of a yellowish grey varied with brown as well as the end of the abdomen, of which the rest is of a paler grey. The antennae brown and filiform." Provence.

race *canariensis*, Reb. *Ann. N. H. Hoff. Mus. Wien.* IX. 58 (1894).

FIG.—*l.c.*, XXIV. plt. XII. f. 17 (1910).

ORIG. DESCRIP.—"The size on the average is somewhat smaller than the S. European *putrescens*, the head and thorax are somewhat paler

(reddish) coloured. Neck and patagia with only indistinct dark cross-streaks. The forewings show no difference from *putrescens*, beyond the discal spot which may be up to double the size. Yet the deep dark grey hindwings are so strikingly different, being only somewhat paler grey towards the base, while in *putrescens* they are almost pure white, and only the veins are grey powdered towards the outer margin. The black marginal dots are distinct, the fringes whitish. On the underside all the wings are almost unicolorous dusky grey, much darker than in *putrescens*, the hindwing with a dark discal dot, always wanting in *putrescens*. Sometimes there are traces of a dark transverse line visible on all the wings." Canary Isles.

Hampson wrote "Smaller; forewing darker, on underside with prominent discoidal point."

Hamp. *Cat. Lep. Ph.* V. 540 (1905).

Subsequently Dr. Rebel, l.c., 335 (1910), says, "A more recent examination of the three type specimens from Fuerteventura leaves no doubt, that here is a species, of a certainty, distinct from *putrescens*, the characteristics of which were correctly recognised in the original description. The double, white very large central spot of the forewing and the grey-brown hindwings in both sexes allows us to readily recognise the smaller more delicate species, which Hampson did not."

Leucania, Ochs. (1916) [*Caradrina*, Hb. (1822): *Nonagria*, Hb. (1825): *Arenostola*, Hamps. (1910)]: *brevilinea*, Fenn.

Tutt *Brit. Noct.* I. 37 (1891): Barrett *Lep. Br. Is.* V. 119. plt. 200 (1899): Stdgr. *Cat.* edIII. 188 (1901): Splr. *Schm. Eur.* I. 217. plt. 29, f. 24 (1906): South *Moths Br. Is.* I. 308. plt. 144 (1907): Hamp. *Lep. Phal.* IX. 284 (1910): Warr.-Seitz. *Pal. Noct.* III. 235. plt. 49d. (1911): Culot. *N. et. G.* I (1). 211. plt. 38. f. 35 (1909).

Barrett says "Not very variable . . . the black streak is occasionally joined to the extended black dusting, which then forms a longitudinal blackish stripe nearly the whole length of the wing. The ground colour also varies from reddish-drab to grey-drab." (*pallida*, Edel.)

The forms to be considered are:—

brevilinea, Fenn. *Ent. Mo. Mag.* I. 107 (1864).

f. *sinelinea*, Farn. *Ent.* IX. 103 (1878).

f. *alinea* ? (probably an error).

ab. *suffusa*, Edelsten. *Ent. Rec.* XIV. 103 (1902).

ab. *nigrofasciata*, Edel. l.c.

ab. *bilinea*, Edel. l.c.

ab. *pallida*, Edel. l.c.

ab. *rufescens*, Edel. l.c.

ab. *ochracea*, Edel. l.c.

Tutt dealt with *brevilinea*, the typical form and *sinelinea*, that without the basal line.

ab. *suffusa*, Edel. *Ent. Rec.* XIV. 103 (1902).

ORIG. DESCIP.—"Suffused with dark smoky-grey scales." Occurs in both the typical form and in *sinelinea*.

ab. *nigrofasciata*, Edel. l.c.

ORIG. DESCIP.—“Nervures 2-5 edged with black, making a longitudinal fascia, more or less connected with central spot and basal dash.” Occurs in both main forms.

ab. *bilinea*, Edel. l.c.

ORIG. DESCIP.—“Lower spot of each row of dots running into each other making a black dash.”

ab. *pallida*, Edel. l.c.

ORIG. DESCIP.—“Powdered with scales of a light ground colour, especially along the costal margin.” Occurs in both main forms.

ab. *rufescens*, Edel. l.c.

ORIG. DESCIP.—“Ground colour of forewings reddish.” Occurs in both main forms.

ab. *ochracea*, Edel. l.c.

ORIG. DESCIP.—“Ground colour of forewings light ochreous, slightly dusted with black scales. The usual row of dots slightly indicated, but no other markings visible.”

Leucania, Ochs. (1816) auct. [*Sideridis*, Hb. (1822): Seitz: *Alotia*, Hb. (1822) Meyr: *Cirphis*, Walk. (1865), Hamp. South] *comma*, L.

Tutt gave the Linnaean description from *Sys. Nat.* edXII (1767) p. 850. The species was originally described in the *En. Succ.* (1761) no. 1191.

ORIG. DESCIP.—“*Spirilinguis cristata*, alis cinereis deflexis lineola nigra adjacente tenuiori albae.

“*Rustica media*. Alae superiores cinereae, substriatae; litura linearis atra, a basi alae, ad-ejusdem medium, longitudinalis, cui a latere inferiore adjacet stria alba longior. Alae subtus cinereae. Abdomen subferrugineum.”

Hübner gives an excellent figure of the species (3)228 under the name *turbida*.

Tutt says Hübner figures the dark British form 617 under the same name *turbida*. This is an unaccountable slip, as fig. 617 is not a *comma* form but a form of *Noctua festiva*. It should be fig. 618.

Illiger, *Verz. Wien. neu ausg.* (1801) l. 225, discusses at length the supposed identity of the *comma* (1) of Linn. *Sys. Nat.* XII. (2) of Schiff. *Verz.* (3) of Bork. *Eur. Schm.* IV and (4) of Fab. *Sys. Ent. emend.* III(2) with *petrorhiza* = *detersa*.

Tutt *Ent.* XXI. 154 (1888): *Brit. Noct.* l. 37 (1891): Barrett. *Lep. Brit. Is.* V. 152. plt. 203 (1899): Stögr. *Cat. Illud.* 192 (1901): Hamp. *Lep. Phal.* V. 520 (1905): Spuler. *Schm. Eur.* l. 225. plt. 43, 44 (1906): South. *Moths Br. Is.* I. 309. plt. 147 (1907): Warr. Seitz. *Pal. Noct.* III. 98. plt. 25a (1910): Culot, *Noct. & Geom.* I (2). 36. plt. 44. 5 (1909).

Culot gives detail characters for distinguishing *comma* from *undergigi* and *lineata* two so very closely allied species, that they appear to be subspecies of *comma*, but have long been held as distinct.

Freyer's fig. *Neu. Beitr.* is certainly not good. H.-S. says "schlecht," bad.

Kleeman's fig. *Ins. belust.* V. plt. 24. appears to be either *impura* (as Freyer says) or *pudorina* and not *comma* as labelled.

The figure of Warr.-Seitz, plt. 25a, labelled *suffusa*, is an extremely dark form much more so than the average British form which Tutt called *suffusa*, and which was represented by Hübner's fig. (617) 618. labelled *congener*. (see *Br. Noct.* I. 37). I have not seen such a dark example of the species.

If Hübner's fig. 618 represents Tutt's *suffusa* as he says it does, surely the name *congener*, Hb. must supplant *suffusa*, Tutt.

Guenée puts Duponchel's description and figure of *impura*, *Hist. Nat.* VII. 73. plt. 105. f. 3., to refer to *comma*.

There are a number of named forms which are either species or subspecies of *comma* and which are only with difficulty separated from it, mainly by degree of development or partial suppression of characters, and by their restricted area of nativity. They are *lineatipes*, Mre., Indian; *deserticola*, Barb., Ural; *andereggii*, Bdv., Alps and Pyrenees; *lineata*, Ev., Mongolia.

List of forms to be considered :—

comma, L., *Fn. Suec.* 316 (1761).

turbida, Hb., *Samml.* 228 (1802).

congener, Hb., *l.c.* 618 (1818) nec. 617.

race *suffusa*, Tutt, *Ent.* XXI. 154 (1888).

ab. *ochracea*, Tutt, *Brit. Noct.* I. 37 (1891).

ab. *nigropuncta*, Tutt, *l.c.*

race *nigrofasciata*, Hamps., *Moths. Ind.* II. 279 (1894).

ab. *rhodocomma*, Püng., *Iris* XIII. 120 (1900).

race *engadinensis*, Wagn., *Ent. Zt.* XXIII. 19 (1909).

Tutt deals with *comma* and *turbida*, the species, the dark form *suffusa* (*congener*), the brown red ochraceous *ochracea* and the black dotted *nigropuncta*.

The aberration in the Dobrée collection with the "costal and inner margins distinctly whitish" from Beverley, Yorks, is merely some emphasis of two usually lighter areas.

Barrett says "A little variable in the thickness and intensity of the longitudinal black and brown streaks, otherwise extremely constant." He also records a specimen with ground colour white and another in which the usually brown stripes of the forewings were all black, thickened and lengthened, almost usurping the area of the wing.

race *nigrofasciata*, Hamp., *Moths. Ind.* II. 279 (1894).

ORIG. DESCRIPT.—"♂ Pale brown. Forewing with a prominent black streak from base below median nervure: the veins pale; dark streaks in the interspaces towards outer margin; costa grey, speckled with black. Hindwings fuscous. Underside with the forewing and costa of hindwing brown." Kulu.

Described as a species by Hamps., in 1894 and recorded by him in *Lep. Ph.* as a form of *comma* in 1905.

ab. *rhodo-comma*, Püng. *Iris*. XII. 120 (1900).

ORIG. DESCRIP.—“Differs from the ordinary German specimens by the strongly reddish coloration of the whole insect. This handsome form differs still more from the far darker high mountain specimens which I took at Zermatt and which came of almost the same form from Kuku-Noor; a similar alpine specimen Freyer has figured, 406. 2., of which his subsequent determination is the *turbida*, Hb.”

Three, apparently bred, pairs from Alexander Mts.

Hampson says, *l.c.*, “Ground colour of head, thorax and forewing purplish-red.”

Warr.-Seitz, *l.c.* calls it a species.

race *engadinensis*, Wagn., *Ent. Zt.* XXIII. 19 (1909).

ORIG. DESCRIP.—“While those specimens which are obtained in the lower ground are much paler coloured, and possess reddish marginal area of forewings and light hindwings, which are only darker in the marginal area, I have obtained through Herr A. Oertel-Hamburg specimens from the Engadine, which from their striking darkening are very noticeable. Thorax and forewings are darker grey-brown, without trace of reddish colour, but particularly the hindwings in their appearance as a whole and the abdomen are blackish-brown, as well as the whole of the underside; the latter also has a darker shading of colour than the upperside.” Engadine.

Leucania, Ochs. (1816) auct. [*Sideridis*, Hb. (1822) Warr.-Seitz., *obsoleta*, Hb.

Tutt *Brit. Noct.* I. 38 (1891): Barrett *Lep. Brit. Is.* V. 147, pl. 203 (1899): Sttgr. *Cat. Hied.* 191 (1901): Hamp. *Lep. Pal.* V. 599 (1905): Splr. *Schn. Eur.* I. 224, 361, pl. 43 (1906): South *Moths. Brit. Is.* I. 307, pl. 147 (1907): Warr.-Seitz. *Pal. Noct.* III. 101, pl. 25hi (1910): Culot *N. et G.* I(2). 30, pl. 43, fig. 7 (1909).

It is generally agreed that Hübner's fig. does not represent the average examples, in fact the shape is defective and the colour too intense.

H.-S. says that Freyer's fig. 413 of V. is *obsoleta* rather than *loreyi*, although the marginal dots are wanting, the shape and colour are wrong for *loreyi*.

Of the variation Barrett says, “There is some small variation in the ground colour, toward brownish-buff, and in the distinctness of the fine dark lines which margin all the nervures, those edging the median and its branch being sometimes thickened, or those above it blackened, so that in some individuals there is considerable darkening of the costal half of the wing.”

Culot says that the species is very stable in its coloration; it may be more or less striated with brown between the nervures.

Browne describes a specimen in the Dobrée collection in which, “The transverse row of black dots (is) more conspicuous than in the others.”

Another in which, “The black striations are more plainly marked than in the others.”

Another in which, "The wings are of a more uniform buff than those of the others in the series."

Another in which there is, "A large black spot on the inner margin at the end of the transverse line and another nearer the base."

And another in which there is, "No trace of the dorsal and sub-dorsal lines." All are from Germany.

The forms to be considered are :—

obsoleta, Hb., *Samml.* 233 (1802).

ab. *nigrostriata*, Tutt, *Brit. Noct.* I. 38 (1891).

ab. *grisea*, Tutt, *l.c.*

f. *obsoletior*, Splr., *Schm. Eur.* I. 361 (1906).

Tutt treats of *nigrostriata*, in which the black scaling between the veins is more suffused, and *grisea* with ground colour pale grey.

f. *obsoletior*, Splr., *Schm. Eur.* I. 361 (1906).

ORIG. DESCRIP.—"Specimens have been bred at Jena, which have no black scales on the forewing except the outer marginal spots and a few scales on the inner margin, thus causing the white colour of the veining to be strongly emphasised; this is more striking and complete in the female."

Leucania, Ochs. (1816) [*Sideridis*, Hb. (1825) Warr.-Seitz], *straminea*, Tr.

Tutt *Ent.* XXI. 177 (1888): *Brit. Noct.* I. 39 (1891): Barr. *Lep. Brit. Is.* V. 142, plt. 202 (1899): *Stdgr. Cat.* IIIed. 191 (1901): Hamp. *Lep. Phal.* V. 598 (1905): Splr. *Schm. Eur.* I. 224, plt. 43 (1906): *South Moths. Br. Is.* I. 306, plt. 147 (1907): Warr.-Seitz. *Pal. Noct.* III. 101, plt. 25g. (1910).

H.-S. suggests that the *ectypa* of Hübner, 321, is this species; he admits the figure is very defective as *straminea*, too large, too red, etc. If it were possible to accept this, the name *ectypa* would supplant *straminea*.

Seitz figures of *straminea* are the form *obsoleta* and not typical *straminea*. The male, however, has two large black dots of the post-discal series remaining.

H.-S. says that Freyer's fig. 123 is recognisable but bad, the colour and shape is faulty, the fine black middle dot is wanting.

Barrett says the variation "is usually but slight, from whitish-drab to more or less tinged with pale red; the dark stripe from the base also varies considerably in intensity." He reports a specimen with the dark stripe extended and much emphasised; another of a red-drab with a black spot at the base and much dusted with black; another with the whole of the forewings streaked with black lines; another dull reddish grey with slightly darker lines, and another a very pale specimen with two very faint dots only.

The forms are :—

straminea, Tr., *Schm. Eur.* V(2) 297 (1829).

[*ectypa*, Hb., *Sam. Noct.* 231 (1825).]

[*pallens*, Freyer, *Neu. Betr.* VII. plt. 603 (1851).]

ab. *obsoleta*, Tutt, *Ent.* XXI. 177 (1888). See Barrett above.

ab. *intermedia*, Tutt, *l.c.*

ab. *rufolinea*, Tutt, *l.c.* See Barrett above.

ab. *nigrostriata*, Tutt, *l.c.* See Barrett above.

Tutt dealt with the delicate wainscot or straw-colour form, with only slight traces of markings, *obsoleta*; the pale form with very conspicuous markings, *intermedia*; the form with reddish ochreous ground, *rufolinea*; and the *nigrostriata* form thickly strewn with black scales.

Leucania, Ochs. (1816) [*Sideridis*, Hb. (1825)], *impura*, Hb.

Tutt *Ent.* XXI. 197 (1888): *Brit. Noct.* I. 39 (1891): Barrett *Lep. Br. Is.* V. 135, plt. 201 (1899): *Stdgr. Cat.* IIIed. 191 (1901): Hamps. *Lep. Phal.* V. 596 (1905): Splr. *Schn. Eur.* I. 223, plt. 43 (1906): South *Moths. Br. Is.* I. 305, plt. 147 (1907): Warr.-Seitz. *Pal. Noct.* III. 100, plt. 25f. (1910): *Culot N. & G.* I(2), 29 plt. 43, f. 4 (1909).

Hampson assumed that Hübner's fig. 396 was not published until 1827, whereas it is known to have been published some time in 1808, hence *fuliginosa* is not the specific name as he (Hampson), concludes. (Hampson wrote *fuliginosa* in place of *fuliginosa* which Haworth wrote. See *Lep. Brit.* page 174 and Index 597).

Plate 25 of Seitz is not well coloured, the figures of *Sideridis* and *Meliana* species are much too sandy coloured, too dark with an absence of the influence of white.

H.-S. says (II. 235), that Hübner's fig. 396 is bad, shape wrong, the black dots of forewing incorrectly placed, he knows of no specimen with a black dot in cell 2 of the hindwing. He also says that Hübner's fig. 616 *congrua* is a tolerably good *impura*, but the forewing is too broad, and the black dots not distinct enough.

Warr.-Seitz (III. 100), does not accept *fuliginosa* and *punctina* as forms, but put the names as synonyms of *impura*. Hübner's *congrua*, 616, is treated as a good species in the genus *Hyphilare*.

Haworth suggests that *punctina* is a sexual form of *impura*, and Stephens agrees that it is *impura*.

Guenée says *punctina*, Haw. "An insignificant variety."

Of the variation Barrett says, "There is some variation in the colour, from ochreous drab to reddish drab, and in the intensity of the dark stripe from the base, which sometimes is but faint: the black dots of the second line are occasionally accompanied by another on the dorsal line. In Scotland and Ireland there seems to be a tendency to blackness in the hindwings, in combination with unusual paleness in the forewings."

"There was an *impura* in the Horne collection entirely dark brown (nearly black)."—E.A.C.

The forms to be considered are:—

impura, Hb., *Samml. Noct.*, 396 (1808).

race *fuliginosa*, Haw., *Lep. Brit.*, 174 (1809).

f. punctina, Haw., *l.c.* (1809), Wood, *Ind.*, 363.

congrua, Hb., *l.c.*, 616 (1818).

ab. arcuata, Steph., *Ill.* III. 75 (1829), Wood, *Ind.* 364.

race *dungana*, Alph., *Hor. Ross.* XVII. 83, pl. 3, f. 56 (1883).

ab. punctilinea, Tutt, *Ent.* XXI. 179 (1888).

race *transbaikalensis*, Stdgr., *Iris*, V. 367 (1892).

race *amurensis*, Stdgr., *l.c.* (1892).

ab. fuscipennis, Warr.-Seitz., *Pal. Noct.* III. 100, pl. 25f. (1910).

Tutt treated of the type *impura*, the ochreous British form *fuliginosa*, the red form *punctina* and the form *punctilinea* with black scales along the nervures.

ab. arcuata, Steph., *Ill.* III. 76 (1829).

FIG.—Wood, *Index*, 364 (1839).

ORIG. DESCIP.—“*Alis anticis pallidè stramineis, punctis duobus nigris medi, posticis albis cinereo-infuscatis serie arcuatâ punctorum fuscorum pone medium.*”

“Head and thorax pale straw-colour, the latter rather darker in front; anterior wings the same, appearing obscurely striated with rufescent, the nervures being of the former colour, and the intervals being rufescent. with two straw-coloured streaks, united at their origin; on the disc are two conspicuous black spots, one placed at the bifurcation of the interior discoidal nervure, the other between that and the hinder margin of the wing; the hinder margin immaculate; cilia reddish straw-colour; posterior wings white, slightly tinted with cinereous towards the hinder margin, with an arcuated series of black or fuscous spots, a little behind the middle, each spot being placed upon a nervure; cilia white.” Ripley 2 specimens only.

Of this Guenée says, V. 92, “differs in the clearer colour, the hindwings almost white, slightly shaded with blackish, with a series of dots on the nervures.”

race *dungana*, Alph. *Hor. Ross.* XVII. 83 (1883).

FIG.—*l.c.* pl. 3, f. 56 (1883).

ORIG. DESCIP.—“*Statura habituque L. impura maris alae anticae brunneae fusco albidoque striolatae; nervo mediano pallido, subtus fusco adumbrato. Punctulo discocellulari nigro, parvo vel nullo. Posticae griseo fuscae. ♀ dilutior, grisescens.*”

“The ♂ antennae are as in *impura* except that the cilia, which adorn each joint to the number of two, are shorter in *dungana*. In other respects as in *impura*, except that the ground colour of the figure is much darker and testaceous red-brown.”

Hamp. *Cat Lep. Ph.* V. 596 (1905) says, “Much browner or more fuscous; forewing with the dark streaks indistinct; hindwing nearly uniform fuscous.”—W. & E. Turkestan; Tibet.

race *transbaikalensis*, Stdgr., *Iris*, V. 367 (1892).

ORIG. DESCIP.—“More or less intensive light reddish-brown coloured, forewings with strongly emphasised white veins, especially towards the outer margin, and almost wanting with the dark (blackish) longitudinal streak below the median.”

Hamp. *l.c.* says “Forewing irrorated with red-brown, the dark streaks almost obsolete.” Dauria.

race *amurensis*, Stdgr. (1) *Iris*, V. 367 (1892) and (2) *Rom. Mém.* VI. 475 (1892).

ORIG. DESCIP.—(1) "They have white veins, a prominent dark longitudinal streak, mostly a cross row of small black dots, but no brown suffusion on the forewings."

(2) "All the specimens are strikingly much darker, somewhat reddish or brownish suffused and more sharply streaked."

Of this form Hamp. says, *Cat. Lep. Ph.* V. 596 (1905), "Darker; forewing with the whitish veins and dark streaks more distinct."—Amur.

ab. *fuscipennis*, Warr.-Seitz., *Pal. Noct.* III. 100 (1910).

FIG.—*l.c.* plt. 25f.

ORIG. DESCIP.—"Smaller than typical. The hindwing is blackish fuscous." Calabria, La Grave, Hautes Alpes.

Leucania, Ochs. (1816) [*Sideridis*, Hb. (1825)], *pallens*, L.

Tutt *Brit. Noct.* I. 40 (1891): Barrett, *Lep. Br. Is.* V. 140, plt. 201 (1899): Stdgr. *Cat.* IIId., 191 (1901): Hamp. *Lep. Ph.* V. 598 (1905): Splr. *Schm. Eur.* I. 223, plt. 43 (1906): South *Moth. Br. Is.* I. 304, plt. 147 (1907): Warr.-Seitz. *Pal. Noct.* III. 101, plt. 25gh (1910): Culot *N. et G.* I(2), plt. 43 (1909).

Tutt took his Linn. description from XId. (1767). In the original Xed. (1758) no mention is made of the dots on the forewings.

The *Fn. S.*, no 1175 (1761) has "Media. Tota albido pallens. Alae eodem striatae; superiores in medio puncto nigro minutissimo, ut vix conspicuo. Alae omnes subtus similes atomis nigris: margine postico punctis nigris minutissimis." Only in the *Sys. Nat.* XId. did the description mention the typical 3 dots on the forewings.

Of the variation Barrett says, *l.c.* "From pale yellow-drab to red-drab. Those of the deepest red are apparently found in Ireland, some of them being of a terra-cotta or almost brick-red colour, but always with the white nervures.

"In all the bright forms there is also a tendency to darker clouding of the hindwings or else partial darkening of their nervures, or both. In the pale individuals the black dots of the second line are often almost imperceptible, or quite absent."

Browne, *Cat. Dobr. Coll.* 18, describes a form near *ectypa*, Hüb. "Hardly reddish enough for that variety, and without the dark grey shade along the hindwings." Weel, E. Yorks.

List of forms:—

pallens, L., *Sys. Nat.* Xed., 510 (1758).

ab. *pallida*, Bork., *Eur. Schm.* IV. 719 (1792).

ab. *ectypa*, Hb., *Saml.* 231 (1802). Seitz. plt. 25h.

ab. *rufescens*, Haw., *Lep. Brit.* 175 (1809). Wood., *Ind.* 366.

ab. *arcuata*, Steph., *Ill.* III. 76 (1829). Wood., *Ind.* 364.

ab. *sufusa*, Steph., *l.c.* 77. Wood., *Ind.* 367.

ab. *ochracea*, Steph., *l.c.* 77. Wood., *Ind.* 368.

ab. *rufostriata*, Pack., *Proc. Bost. Sy. N. Sci.* XI. 36 (1866).

ab. *pertracta*, Morris, *Proc. Bost. Sy. N. Sci.* XVII. 120 (1875).

race *melania*, Stdgr., *Stett. v. Zt.* 48 (1889). Seitz. 25h.

race *infumata*, Alph., *Rom. Mem.* V. 166 (1889).

subsp. *luteopallens*, Smith, *Proc. U.S. Nat. Mus.* XXV. 180 (1902).

race *candida*, Rocci, *Atti. Soc. Ligu. Sci. Nat. e Geog.* XXIV. 153 (1913-4).

Tutt treats of (1) the type; (2) the fine red form *ectypa*, Hb.; (3) the red form without dots, *rufescens*, Haw.; (4) *arcuata*, Steph., with a submarginal row of dots; (5) the form which tends to become melanic ab. *suffusa*, Steph.; and (6) the usually small, pale ochreous ab. *ochracea*, Steph.

West. and Humph., *Br. Moths*, I. 218 (1843), said that Doubleday conjectures that since *ochracea* was taken at Darenth and Whittlesea in the autumn it was the autumnal brood of *pallens*.

Guenée says, *l.c.* 93, "*Rufescens*, *ochracea* and *suffusa* of English authors are scarcely varieties. The first is found generally in the females, the second consists of small and very pale individuals, as for the third it has only a single black dot on the disc. The form *pallida* of Borkhausen according to Treitschke, is of this character, which should have, if one refers to the description of the latter, the hindwings white with the nervures ochraceous. All these differences, which are never constant, and which combine with all other modifications, should not constitute distinct races."

Warr.-Seitz, *l.c.* 101 (1910), treats *melania*, Stdgr. = *infumata*, Alph., as a separate species; considers *rufescens*, Haw., as the *ectypa*, Hb.; accepts *favicolor* as a good species.

f. pallida, Bork., *Nat. Eur. Schm.* IV. 719 (1792).

ORIG. DESCIP.—"Size and shape like that of *comma*, but often smaller than that species. They have the forewings of a whitish ground colour, and are on both sides streaked with ochre-yellow on the veins, but at the first glance appear ochre-yellow streaked with whitish lines which are very thick. In the middle is a single small brown dot, and there are found no other markings. The hindwings are whitish and the veins are scarcely perceptibly yellowish tinged. All the wings below are shining whitish and the hindwings have a brown dot in the middle. The hind margin on both sides is without dots. The antennae are brownish and yellowish on the back. The head, which is without a crest but is very woolly, as well as the abdomen, is unicolorous pale ochre-yellow. This pale colour includes the thorax and the feet but paler." "Probably will be mistaken for *pallens*."

ab. *rufostriqua*, Pack., *Proc. Bost. Soc. N. Sci.* XI. 36 (1866).

FIG.—Holl., *Moth Book*, pl. XIX., f. 27 = *Caradrina punctivena*.

ORIG. DESCIP.—"Of a pale whitish luteous grey. Head and body alike concolorous. Forewings with the costal nervure streaked with whitish scales, as is the median nervure and its branches. The middle of the wing (longitudinally) is shaded with rusty-brown between the nervules. Fringe concolorous with the rest of the wing. Hindwings paler with no markings and only a marginal row of brown inter-nervular lines; fringes paler. Caribou Island, Sts. of Belle Isle." Smith did not know this in his *Cat.* 1893, but in his "Contributions" 1902 says

it is a *Caradrina*, in which genus Dyar includes it in his *Cat.* 1902, identifying it with the *punctivena*, Smith.

ab. *pertracta*, Morris, *Proc. Ent. Soc. N. Sci.* XVIII. 120 (1875).

ORIG. DESCRIPT.—“34mm. Eyes hairy. Head and thorax concolorous with the anterior wings. The latter are uniform salmon yellowish colour, interrupted only by the median vein, which is white, as well as its second and third branches: the apical costal branches are also whitish. Posterior wings and under surface white, immaculate. Philadelphia. Allied to *Heliophila phragmatidicola*, Guen. Separated by the remarkable colour of the forewings and the entire lack of ornamentation.” Pennsylvania.

Smith, *Contrib.* 1902, p. 164, doubts if this one specimen be an American insect and says that the author was “sometimes misled as to the source of his specimens.”!! “I believe it to be an unusually well-marked *pallens*, with a reddish tint.”

race *melania*, Stdgr., *Stett. ent. Zt.* 48 (1889).

FIG.—Warr.-Seitz. *l.c.* pl. 25h (?)

ORIG. DESCRIPT.—“This stands near a very large *pallens*, which it is distinguishable by having a dark upperside of the hindwings and a dark underside of the forewings. The forewings of *melania* have the same pale yellowish ground colour but without the brownish longitudinal streaks of *pallens*. There is also at the end of the lower part of the middle cell a black dot, but which, as in *pallens*, may be wanting. Below the median lies a very obsolescent somewhat darkened (blackish) longitudinal trace, about as in *impura* or *straminea*, which in *pallens* itself is brownish. The underside of the forewing is grey-black up to the narrow grey-white costa and broad outermargin, while in *pallens* and also other light species it is light on the upperside. So with the hindwings, in opposition to all these species, they are black-grey, with whitish fringes and somewhat lighter tinge on the outer and costal margins. They are on the underside, as in the male, somewhat more distinctly darkened in the discal part, strewn with blackish scaling.”

Hamp. *Cat. Lep. Ph.* V. 599 (1905). “Hindwing grey; forewing fuscous below.”—W. & E. Turkestan, Thibet.

race *infumata*, Alph., *Rom. Mem.* V. 166 (1889).

FIG.—Warr.-Seitz. *l.c.*, pl. 25h (?)

ORIG. DESCRIPT.—“Alae anticae subtus disco nigricante (*infumato*), posticae supra grisescentes. Anticae supra fulvescentes.

“The 8 specimens ♂ and ♀, from Aram-Koungui and the Hissar Mts., have the forewings above more reddish than the European type, almost as in the ab. *ectypa*, Hb. Below the same wings have the disc blackish (*eufumé*). The hindwings above are strongly suffused with greyish, which the *pallens* of southern Russia never have, nor do those of Central Europe, so far as I can find, after having a great number of specimens through my hands. This form appears constant in the localities where it occurs.”

“Might not ab. *ectypa*, Hb., be a case (as an aberration) of atavism towards this form which I name *infumata* and which is probably the more ancient from which the typical European form is derived?”

subsp. *luteopallens*, Smith., *Proc. U.S. Nat. Mus.* XXV. 180 (1902).
 FIG.—Draudt.-Seitz, *Amer. Noct.* VII. pl. 25b.

ORIG. DESCIP.—“Ground colour a creamy yellow, primaries with the veins paler, the interspaces with somewhat more luteous streakings. Head collar and thorax immaculate. The median vein and its lower branches tend to paler, and a slightly darker shade is usually noticeable below the median. A black discal dot at the end of the cell. Transverse posterior line reduced to two black dots. Secondaries white, the veins on disk and a small area of the disc itself tinged with blackish. Beneath yellowish white; primaries with a blackish streaking at the end of the cell and an outer dusky venular band; secondaries with a tendency to a dotted outer line, which is rarely complete and may be entirely wanting. N. and Middle Atlantic States generally, from Canada to Florida.”

In his *Cat.* 185 (1893), Smith called the American representative *pallens*, but in his *Contrib.* (ante) in 1902 he gave it the name of *luteopallens*, stating they were “very closely allied.” He compared the genitalia and found them different in degree, “resembling each other closely.” He concludes by saying “The alliance is close but as species go in this group *luteopallens* is not the same as *pallens*.”

race *candida*, Rocci., *Atti. Soc. Ligur. Sci. Nat. e Geog.* XXIV. 153 (1913-4).

ORIG. DESCIP.—“At Nice, Monferrat and more seldom in the neighbourhood of Turin there has been collected a form, which has the forewings completely white as the hindwings without any yellowish suffusion. It seems necessary to fix this form with a name, the more so because it represents a tendency to a variation in the way opposite to that which is more frequent in *pallens*, which often produces forms coloured more inclining to red and more obscure forms.”

Leucania, Ochs., 1816 [*Sideridis*, Hb., (1825) *faricolor*, Barr.].

This species was described subsequent to the publication of *Brit. Noct.*

Of the genitalia Pierce says, *Genit. Noctuidae*, 27 (1909) “I can see no difference in the form of the genitalia of this and *pallens*, except that *faricolor* is larger.” The description was taken from the original specimen captured by Mathew.

This fact does not necessarily show that *pallens* and *faricolor* are forms of the same species, and we have preferred to consider them as distinct species since the characteristics so ably summarised by Tutt and Mathew strikingly suggest their separation.

Leucania faricolor, Barrett, *Ent. Mo. Mag.* 100 (1896).

FIG.—Barr. *Lep. Br. Is.* V. 140, pl. 101, f. 3. (1899).

ORIG. DESCIP.—“♂ Forewings rather broader than in *L. pallens*, and more pointed at the apex, shaped in fact as in *L. straminea*; entire surface of a smooth soft honey colour, or colour of the honeycomb (a shade of buff difficult to describe) having the nervures faintly perceptible but not paler in colour. At the apex of the discal cell is a round black dot as in *L. pallens*, and two more lie in the position of the ordinary “second line” or “elbowed line,” which is further indicated by faint

blackish dashes more particularly towards the costa, where this faint line is decidedly curved back. Hindwings rounded, white at the base and apex, but with the middle area tinged with smoky-grey and reddish, all the nervures broadly dusted with blackish, cilia white. Thorax rather robust, brownish buff in front, paler buff or honey coloured towards the back; shoulder lappets a little raised and finished off with long scales (lying back): fascicles of hair scales at the back white, curved in so as to meet on the base of the abdomen which also has an abundance of long white scales on its basal segments covering its pale buff surface; lateral tufts large faintly tinged with grey and yellowish; anal tufts yellowish."

"♀ Forewings broader and more decidedly acuminate, also as strongly honey-coloured."

Tutt writes, *Ent. Record* XVI. 251 (1901), "The main comparative features between this species and *L. pallens*, relating both to structure and habits, are summarised by Mr. Mathew as follows:—

"1. *L. favicolor* appears from three to four weeks in advance of *L. pallens*.

"2. Its general appearance, when alive, at sugar, is very different. *L. favicolor* generally sits on the sugar with wings horizontal and quivering, is very shy, and flies off the moment the light is thrown on it, so that one has to be quick in order to secure it in the net as it flies off. *L. pallens* sits with wings closed over the body and is not shy.

"3. *L. favicolor* is a very much larger and more robust insect than *L. pallens*.

"4. The forewings of *L. favicolor* are much broader, smoother in texture, and without the raised veins of *L. pallens*.

"5. The larvae are more robust and of a ruddy colour, and are more like those of *L. lithargyria* than those of *L. pallens*.

"6. The moths reared this year were from eggs laid by three different females, and not one of the moths bred in anyway resembles *L. pallens*.

"7. The variation runs into distinct aberrations, which, although in a sense parallel, are entirely different from those of *L. pallens*.

Further he writes "The two species with which it shows the closest alliance are *L. pallens* and *L. straminea*, nearer to the latter in shape of wing, scaling, and markings, and nearer to the former in structure of thorax and no clear development of prothoracic crest. The scaling is exceedingly smooth and silky-looking, as much so as is that of *Calamia phragmitidis*."

Barrett (1896), Hamps. (1905), South (1907), Rebel (1909). Splr. (1910), and Warr.-Seitz. (1910) all treat *favicular* as a distinct species. Stdgr. (1901) treats it as a form of *pallens*. Meyrick includes it as *pallens*.

Barrett, *F.M.M.*, XXXII. 100 (1896): *Lep. Brit. Is.* V. 110, pl. 201 (1899): Stdgr. *Cat. Hled.* 191 (1901): Tutt, *Ent. Rec.* XVI. 253 (1904): Mathew, *Ent. Rec.* XVII. 11 (1905): Hamps. *Lep. Phil.* V. 595 (1905): South *Moths Br. Is.* I. 304, pl. 149 (1907): Warr.-Seitz. *Pal. Noct.* III. 100, pl. 25k. (1910).

Of the variation Tutt says, *l.c.* 253, "There is a wide range of variation in the hindwings, of which the palest are whitish, with the nervures somewhat darker, whilst the darkest are suffused all over their

area, except their fringes, which in all cases remain of the ground tint, this difference in the tint of the hindwings is not sexual. Leaving out of account this variation of the hindwings we have four distinct groups represented."

Barrett records a variety of *favicolor* in which, "The second line is formed of a complete and conspicuous curved line of black dashes and spots from the costal to the dorsal margin, where it is supplemented by other cloudy black scales along that margin, and by a black spot in the position from which would arise the ordinary first line." He also reports Mathew as taking a form in Essex, "Of a singularly deep smooth red, in which the nervures and the space above the median are all quite evenly suffused with the same red tint." This is probably Tutt's *rufa*.

The forms to be considered are:—

favicolor, Barr., *F.M.M.* XXXII. 100 (1896).

ab. *rufa*, Tutt, *Ent. Record*, XVI. 252-4 (1904).

ab. *rufa-typica*, Tutt, *l.c.*

ab. *lutea*, Tutt, *l.c.*

ab. *lutea-typica*, Tutt, *l.c.*

ab. *intermedia*, Tutt, *l.c.*

ab. *intermedia-typica*, Tutt, *l.c.*

ab. *argillacea*, Tutt, *l.c.*

ab. *obsoleta*, Tutt, *l.c.*

ab. *aenea*, Math., *Ent. Record*, XVII. 14 (1905).

ab. *obscura*, Math., *l.c.*

ab. *pallida*, Math., *l.c.*

ab. *fusco-rosea*, Math., *l.c.*

Hampson, *l.c.* describes a form as "much yellower," and another as "Head, thorax and fore-wing bright rufous; the abdomen and hindwing slightly tinged with rufous." These are probably Tutt's *lutea* and *rufa* respectively.

ab. *lutea*, Tutt, *Ent. Rec.* XVI. 253 (1904)

ORIG. DESCRIP.—"Bright yellow-buff, with discal dot and two dots representing elbowed line."

ab. *lutea-typica*, Tutt, XVI. 253 (1904).

ORIG. DESCRIP.—"Bright yellow-buff, with discal dot and a row of dots or tiny dashes representing elbowed line."

ab. *obsoleta*, Tutt, XVI. 253 (1904).

ORIG. DESCRIP.—"Wainscoat-buff with discal dot and two dots representing elbowed line."

ab. *intermedia*, Tutt, *Ent. Rec.* XVI. 253 (1904).

ORIG. DESCRIP.—"Rufous-buff with discal dot and two dots representing elbowed line."

ab. *intermedia-typica*, Tutt, *Ent. Rec.* XVI. 253 (1904).

ORIG. DESCRIP.—"Rufous-buff with discal dot and a row of dots representing the elbowed line."

ab. *rufa*, Tutt, *Ent. Rec.* XVI. 253 (1904).

ORIG. DESCRIP.—“Deep-reddish with discal dot and two dots representing the elbowed line.”

ab. *rufa-typica*, Tutt, *Ent. Rec.* XVI. 253 (1904).

ORIG. DESCRIP.—“Deep-reddish with discal dot and a row of dots representing the elbowed line.”

ab. *argillacea*, Tutt, *Ent. Rec.* XVI. 253 (1904).

ORIG. DESCRIP.—“Has the forewings of such a distinct dull clayey tint that it reminds one of certain specimens of *Noctua castanea* ab. *neglecta*, and, in addition, the fringes of the forewing have a decided rosy flush that is common in the latter species; the hindwings, too, are especially dark and suffused from the outer margin to the base.”

ab. *aenea*, Mathew, *Ent. Record.* XVII. 14 (1905)

ORIG. DESCRIP.—“Forewings deep orange, one dot only representing elbowed line, hindwings smoky, nervures distinctly darker, fringes pale. A very striking and beautiful aberration.”

ab. *obscura*, Math. *l.c.*

ORIG. DESCRIP.—“Forewings cinnamon-brown, with smoky clouding between some of the nervures; discal dot, and dots forming elbowed line small and indistinct; hindwings smoky, nervures slightly darker, fringes pale.”

ab. *pallida*, Math. *l.c.*

ORIG. DESCRIP.—“Forewings very silky, pale creamy buff, hind margins flushed with rosy pink; discal dot, and dots representing elbowed line, very small and indistinct; hindwings whitish-grey, with nervures slightly darker.”

ab. *fusco-rosea*, Math., *l.c.*

ORIG. DESCRIP.—“Forewings rosy-buff; discal dot and a row of dots representing elbowed line, small but distinct; hindwings pale rosy, with nervures conspicuously shaded with dark brown. This is a delicate and beautiful aberration.”

Leucania, Ochs. (1816) [*Caradrina*, Ochs. (1816): *Calamia*, Hb. (1822): *Arenostola*, Hamps. (1910)] *phragmitidis*, Hb.

Esper's fig. 5, plt. 189, Vol. IV. (1786 1799), with name *semicana* was considered as that of *phragmitidis* by some of the older authors, Oechsenheimer, Herrich-Schaffer, etc., although the description IV(2)b, p. 34 does not agree with it.

This was the *musenlosa* of Stephens and of Wood, but not of Duponchel.

Tutt *Ent.* XXII. 254 (1889): *Brit. Noct.* I. 42 (1891): Barrett *Lep. Brit. Is.* V. 125 (1899): Stüdtgen *Cat. Hb.* 190 (1901): Spuler *Schm. Eur.* I. 222 (1906): South *Moths. Br. I.* I. 303 (1907): Hamp. *Lep. Phal.* IX. 283 (1910): Warr.-Seitz *Pal. Noct.* III. 235 (1911): Culot *N. & G.* I(2) 28 (1913).

Fröyer's fig. 515, *Neu. Beitr.* is one of the pale forms, almost unicolorous both fore and hindwings.

Culot's plt. 42, fig. 18 is an excellent one of the typical form.

Duponchel's plt. 106, f. 5 is probably *pallida*, pale ochreous with a greenish tinge.

Of the variation Barrett says, "The ground colour of the forewings is tinged either with pale olive-brown, or purplish-red, or even approaching to a bright pink. The brighter colour seems to be most frequent in fens."

Browne in his *Cat. Dobr. Coll.* lists an aberration with, "Soft unicolorous ochreous, without the hind marginal reddish tinge that is visible in the others of the series." Leven, E. Yorks.

The forms to be considered are :—

phragmitidis, Hb. *Samm. Eur. Sch.* f. (3) 230 (1802).

r. rerecunda, Evers. *Bull. Mosc.* III. 219 (1848).

r. morawitzii, Mén. *Enum. Corp. An. Mus. Petrop.* I. Lep. (1863).

ab. *rufescens*, Tutt, *Ent.* XXII. 254 (1889).

ab. *pallida*, Tutt, *l.c.*

ab. *olivescens*, Warr.-Seitz. *Pal. Noct.* III. 235. (1911).

ab. *maculata*, Warnk. *Neu. Beitr. Sys. Ins.* II. 93 (1922).

Tutt discussed (1) the typical form of Hübner (2) the red form *rufescens* and (3) the pale form *pallida*.

r. rerecunda, Evers., *Bull. Mosc.* III. 219 (1848).

ORIG. DESCRIP.—"Alae anticae laevissime e virescenti pallide lutescentes, concolores; posticae sordide lutescentes, concolores."

"This *Leucania* has the approximate size and shape of *L. pallens*, L., Tr., the forewings are not marked with veins, but are quite smooth and unicolorous. Their colour is very delicate and difficult to determine; it is a smooth pale yellow, or whitish yellow, which tends very slightly towards greenish, quite without any marking; the nervures are not in evidence. The colour of the thorax is the same as of the forewing; the abdomen is white, somewhat yellowish towards the apex. The hindwings are smooth yellowish-white, turning somewhat to brownish, but without brown on the costa. The underside of all the wings is pale yellowish white, the hindwings quite unicolorous, but the forewings have a blackish shade in the middle." S.W. approaches to the Urals.

r. morawitzii, Mén. *Enum. Corp. An. Mus. Petropol.* I. Lep. (1863).

FIG.—*l.c.* plt. 16, f. 8.

DESCRIP.—(No letterpress). The description of the figure is as follows.—

Hindwings: uniformly dusky with olive tinge, veins discernible. Forewings: outer third as dark as the hindwings diminishing in shade to white very slightly tinged with yellow over the inner third. Veins marked clearly, but not strongly. Hindwing fringes lighter, forewing fringes same shade and colour as the dark outer portion of the wing.

ab. *olivescens*, Warr.-Seitz. *Pal. Noct.* III. 235 (1911).

FIG.—*l.c.* 49e.

ORIG. DESCRIPT.—“Smooth olive-grey, the hindwing dark grey.” N. and Central Europe. The figure does not agree with the description, but is “pale unicolorous whitish ochreous” like *pallida*, with dark grey hindwings.

ab. *maculata*, Warnk., *Neu Beitr. Sys. Ins.* II. 93 (1922) [Suppl. to *Zt. wiss. Ins.-biol.*].

ORIG. DESCRIPT.—“Specimens from the Island Nord-strand (Schles-Hol.) have near the reniform stigma a small dark (satt) ochre-yellow to yellow-brown spot and an orbicular of the same colour. Both dark spots stand out sharply from the pale straw yellow surrounding.”

Leucania, Ochs. (1816) [*Hyphilare*, Hb. (1822)] *litoralis*, Curtis.

Warren-Seitz, *Pal. Noct.* III. 96, placed *lithargyria*, *albipuncta*, *loreyi* and *litoralis* in the genus *Hyphilare*, Hb., distinguished from the rest of the *Leucania* (*Sideridis*) species by having black, lateral tufts at the base of the abdomen.

It is remarkable that most authors, even so late as Meyrick (1928), spell the specific name with a second t, Curtis spelt it *litoralis*, from *litus* (Lat.)=a shore.

Tutt *Brit. Noct.* I. 43 (1891): Barrett *Lep. Br. Is.* V. 157 (1899): Stdgr. *Cat.* II ed. 193 (1901): Hamp. *Lep. Phal.* V. 594 (1905): Splr. *Schm. Eur.* I. 226 (1906): South *M.B.I.* I. 308 (1907): Warr. (Seitz) *Pal. Noct.* III. 96 (1910): Culot *N. & G.* I(2) 39 (1913).

Barrett says of the variation, “Extremely constant in colour and marking; there being but a small variation in the depth of the browner shading, and the uncertainty of white streaks on additional nervures.”

Stephens says, “Some specimens are rather fuscous, and the fuscous streaks between the nervures vary considerably.”

Browne catalogues a form from N. Ireland in the Dobrée collection in which, “The brown shading along the white median nervure is less marked than in the others.”

Meliana, Curt. (1837); *Melia*, Curt. (1828) [*Senta*, Steph. (1829-34)] *flammea*, Curt. (1828)

Curtis in 1828 diagnosed the genus *Melia*. Most authors give the genus as *Meliana*. I have failed to trace when and by whom the change of spelling was made except that Curtis himself in his *Guide* in 1837 ed. III, altered it to *Meliana*. Stephens substituted *Senta* for *Melia*, *Cat.* II. 214 (1829) and again in *Ill.* IV. 296 (1834), because the latter was used in Botany; an absurd alteration.

Tutt *Brit. Noct.* I. 43 (1891): Barrett *Lep. Br. I.* V. 129, pl. 200, 2 (1899); Stdgr. *Cat.* ed. III. 189 (1901): Hamp. *Lep. Ph.* V. 578 (1905): Splr. *Schm. Eur.* I. 219 pl. 42, 31 (1906): South *Moths B.I.* I. 300, pl. 145 (1907): Warr.-Seitz. *Pal. Noct.* III. 101, pl. 25k. (1910): Culot *N. et G.* I. (2). 23, pl. 42, 3 (1913).

Curtis considered *flammea* to be a Tineid and it was so classified by Stephens, Wood, Westwood and Humphrey, and others.

The *dubiosa* described by Treit., *Schn. Eur.* X. (2), 86 (1835) has been considered to be *flammea* by some authors. Guenée says, *Noct.* V. 98 (1852) that he believes *dubiosa* is identical with *flammea*, and he cites H.-S. fig. 356 of *dubiosa*, as confirmatory.

H.-S. fig. 356 seems unusually large. It was copied from a drawing by Mann. He erected a genus *Chilodes* for it and *ulvae*.

Warr.-Seitz *l.c.* 101 considers *dubiosa*, Tr., and *arundinicola*, Dbldy., as synonyms of *flammea*.

The forms to be considered are:—

flammea, Curtis *Ent.* V. 201 (1828).

dubiosa, Tr. X(2) 86 (1835).

arundinicola, Dbldy. *List. Br. Lep.* 7 (1850).

race *stenoptera*, Stdgr. *Rom. Mem.* VI. 474 (1892).

Of the variation of *flammea* Barrett says, *l.c.* V. 128, "There is considerable variation in the tone of the colour of the forewings, greyish-white, whitish-drab, to grey-brown or light red-brown; also in the depth of colour of the longitudinal stripe, which in some individuals is hardly perceptible, in others extends the whole length of the wing, and in some of these is conspicuously dark, all intermediate shades of variation being found." He records a specimen, "Strongly and beautifully suffused with pink," another has "The second line formed of eight or nine short black streaks."

dubiosa Treit. *Schn.* X(2) 86 (1835).

FIG.—H.-S. 356.

ORIG. DESCIP.—"Has the appearance of *venosa* (*alborevenosa*). Head and thorax are white-grey, suffused with straw-colour. Antennae short, serrate, near the insertion white, further outwards dark brown. The abdomen white, with single black hairs, thin, and the segments are clearly marked off by the projecting side hair-tufts. The feet are white above, on the whole underside brownish.

"The forewings are quite lancet-shaped, almost as in *venosa*, especially with regard to the outer margin; on the inner margin, but next the base, it at once becomes wide and in this resembles that of a Tortrix. Its ground is of a pale straw colour. The beginning of the costal margin and of the inner margin up to beyond the middle is powdered white-grey; finally on the white are seen single black atoms. The straw-coloured fringes have at the ends of the wing-nervures a row of small black points.

"The hindwings are white, with pale yellowish gloss.

"Below, the forewings are a shining white-grey. The veins are emphasised and terminated as on the upperside, with black dots. The hindwings have the colour of the upperside."

Sent to Treitschke by Kindermann.

arundinicola, Dbldy.

In his *Cat. of Brit. Lep.* (1850) Doubleday gave the name *arundinicola* to this species which name can have no status as there was neither description nor figure. In ed. II (1859) he puts it as a synonym of *flammea*, Curt. (1828).

race *stenoptera*, *Rom. Mem.* VI. 474 (1892).

ORIG. DESCIP.—“Somewhat smaller and distinctly somewhat narrower winged than German specimens, and particularly characterised by a dark transverse streak in the middle of the forewing, which reaches to the outer-margin just under the apex (in the ♂ very distinct). In German specimens there mostly appears only a very obsolescent darkening under the median. Amur.”

Hampson says, *Cat. Lep. Ph.* V. 578 (1905) “Smaller, forewing narrower, the medial fascia more distinct.”

Tapinostola, Led. (1857) [*Lancania*, Ochs. (1816-25); *Nonagria*, Ochs. (1816-25); *Caradrina*, Ochs. (1816-25) Meyr.: *Arenostola*, Hamps. (1910), Warr.-Seitz] *elymi*, Tr.

Tutt gave only the short Latin diagnosis. Treit., *Schn. Eur.* V(2), 294, says, “At the first glance very similar to *pallens*. At a closer examination the following points are noted: the thorax is coloured as in *pallens*, but more slender and the antennae of both sexes are longer and finer. The abdomen is more yellow, as well as the anal tuft. The forewings are longer and narrower, more rounded; the veins not whitish, but very much brownish powdered; the margins and the fringes darker, brownish-yellow, and inside lies a regular row of small longitudinal streaks. Of the four spots present in *pallens* no trace of them is to be seen. The hindwings are white, with a yellowish gloss. The underside is white, the forewings show yellow powdering. Of the discoidal spots not a trace is to be noted.”

Tutt also attributed *Tapinostola* to Ochs. It should have been to Lederer. (B.N. IV. 96).

Tutt *Brit. Noct.* I. 43 (1891). IV. 96 (1892): *Barr. Lep. Br. Is.* V. 113, plt. 198, 3 (1899): *Stdgr. Cat.* III. ed. 189 (1901): *Spuler. Schn. Eur.* I. 220, plt. 42, 25 (1906): *South Moth. Br. Is.* I. 392, plt. 146 (1907): *Hamps. Lep. Ph.* IX. 287 (1910): *Warr.-Seitz. Pal. Noct.* III. 235, plt. 49d (1911): *Culot N. & G.* I(2) 24, plt. 42, 7 (1913).

The colours of South's figures are too dark.

In many specimens the row of submarginal marks is scarcely, if at all, apparent.

The wings of H.-S's fig. 346 are somewhat too broad for their length, otherwise a good coloured figure.

Duponchel's figure is a good one of the ♂; Culot's a very good one of the ♀.

Seitz figures the female much smaller than the male.

Of the variation Barrett says, *l.c.* V. 113, “Not very variable, slightly so in the depth of brown shading in the nervures, which sometimes spreads and extends towards the apex and the hindmargin.” He records an example which has, “The longitudinal clouding of the nervures smoky-black, and another tending in the same direction.”

Oberthür, *Ét. d'Ent.* V. 71, plt. 9, 2 (1879), says that the Askold form “Differs from the ordinary type of the shores of the Baltic by the row of little dots on the nervures of the lower wings. The Askold type also seems more slender and less robustly developed than in Prussia.”

The dots in the figure are very faint. (See *Brit. Noct.* IV. 96).

I cannot trace that this form has been named. If unnamed it might well be called race **askoldensis**.

The forms to be considered are:—

elymi, Tr. Schm. Eur. V(2)., 294, (1825).

race *procera*, Stdgr. Stett. ent. Zeit. 47 (1889).

ab. *saturation*, Stdgr. l.c.

race **askoldensis**, nov. r. (1929) figured by Obthbr. *Ét. d'Ént.* V. p. 71, pl. IX. (1879).

Tutt, *Br. Noct.* IV. 96, treated of the Askold race in the supplement.

ab. *saturation*, Stdgr. Stett. ent. Zt. 47 (1889).

ORIG. DESCIP.—“*Elymi* from Russia (St. Petersburg) and the Amur district have darker, blackish-grey hindwings and darker suffused, more strongly marked forewings, than the typical German specimens, so that they can be separated from these as var. *saturation*.” Issy-Kul.

race *procera*, Stdgr., Stett. ent. Zt. 47 (1889).

FIG.—Warr. (Seitz), III. 49d.

ORIG. DESCIP.—“The more slender body with longer anal tuft (more developed genitalia) and thinner palpi of *procera* serves well to separate it as a species from *elymi*. I thought at first that this was a local form of the very variable *Tapinostola elymi*. *Procera* is somewhat smaller than *elymi* (30-33mm.). The forewings are sand-yellow, pretty uniformly powdered blackish so that it appears light-grey. The veins in part stand out darker, while especially below the median and beyond the middle cell a lighter streak of ground colour (less powdered, grey-yellowish) shows slightly. The traces of a reniform stigma (as mostly in *elymi*) are very slight, while a transverse line of dots before the outer margin is wholly absent in *procera*. The fringes have two quite obsolescent darker dividing lines and are not as in *elymi* slightly chequered. The shining grey underside has somewhat darker veins. The hindwings are dusky light grey, on the underside a little paler. They are darker than the grey-white hindwings of the German *elymi*.” Issykul.

Warr.-Seitz treats *procera* as a species, in which he follows Hampson, and figures it as smaller than *elymi* and much darker than typical west European forms.

The descriptions of *procera* and *elymi* by Hampson only differ in degree.

Tapinostola, Led. (1855) [*Nonagria*, Ochs. (1816-25): *Leucania*, Ochs. (1816-25): *Caradrina*, Ochs. (1816-25) Meyr.: *Arenostola*, Hamp. (1910)] *hellmanni*, Evers. (1843) = *fluxa*, Hb. (1808).

Tutt took the species as it stood in his time and it was not until Hampson (*Lep. Phal.*) and Warren (Seitz.) compared the large amount of material in their hands that the conclusion was come to that the *fluxa*, Hb. 413, (1808) was the original of the *hellmanni*, Evers. *Fluxa* is a rufous form and thus the ochreous, whitish, grey form *hellmanni*, Evers., is the subspecies or race and not the typical form.

SPECIAL INDEX.

By H^r. J. TURNER, F.E.S.

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The Entomologist's Record & Journal of Variation.

Coleoptera arranged in order of Genera. The other orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

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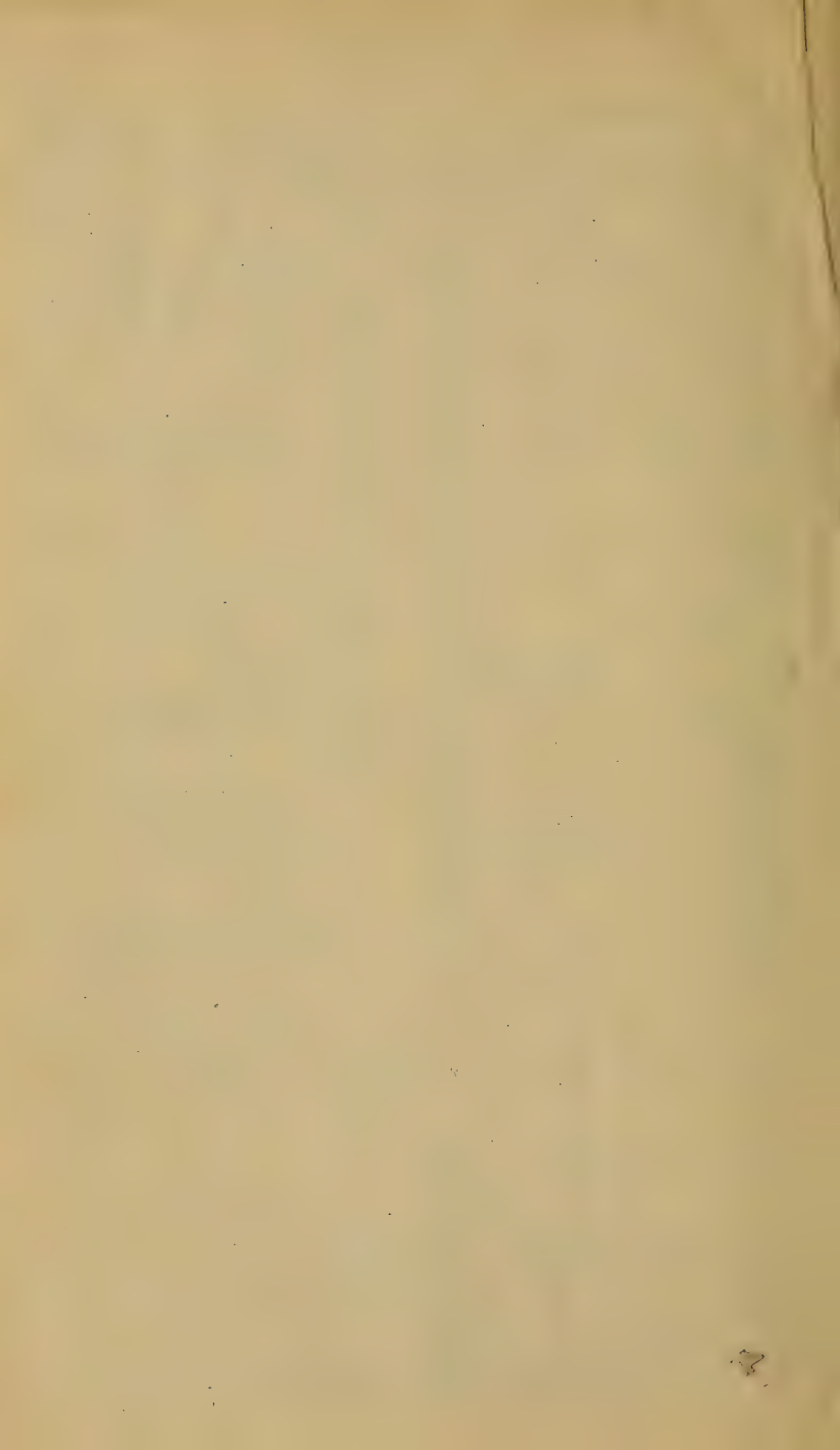
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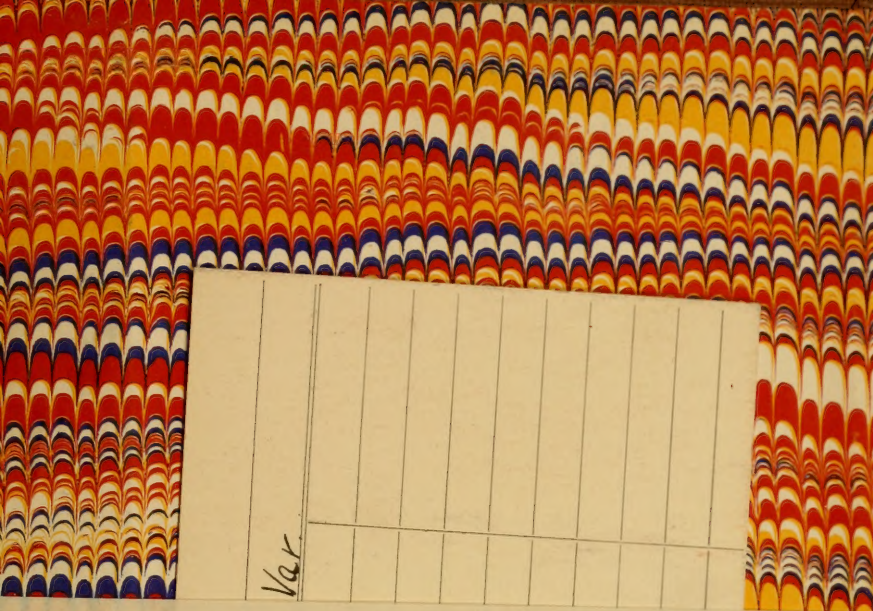
Species in the supplements are not listed.

CORRECTIONS.

- p. 6, line 16 from the bottom, read "H. B. D. Kettlewell."
 p. 7, line 10 from the bottom, for "*N. castanea*" read "*T. castanea*."
 p. 8, line 6 from the top, for "*roboraria*" read "*consonaria*."
 p. 52, line 22 from the top, read "St. Ives, Hunts."
 p. 62, line 16 from the top, for "*sigardi*" read "*sicardi*."
 p. 67, line 5 from the bottom, for "\$1,000,000" read "\$1,000."
 p. 105, line 30 from the top, for "feet" read "inches."
 p. 123, line 32 from the top, for "*B. castrensis*" read "*B. neustria*."
 p. 156, line 2, for "XXIII." read "XXII." and for "XXII." read "XXIII."







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